COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract No. N62474-94-D-7609
Contract Task Order No. 0168

Prepared for

U. S. DEPARTMENT OF THE NAVY
Richard C. Weissenborn, Remedial Project Manager
Engineering Field Division, Southwest
Naval Facilities Engineering Command
San Diego, California

OPERABLE UNIT 3
REMEDIAL INVESTIGATION
ADDENDUM
VOLUME I
ALAMEDA POINT, ALAMEDA, CALIFORNIA
FINAL

DS.0168.15877

January 27, 2001

Prepared by

TETRA TECH EM INC.
10670 White Rock Road, Suite 100
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Chris Fennessy

Chris Fennessy, P.E. Installation Coordinator

TETRA TECH EM INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N62474-94-D-7609 Document Control No. DS . 0168 . 15877-01

TO: Mr. Richard Selby, Code 02R1
Contracting Officer
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street, Suite 1100
San Diego, CA 92132-5190

DATE: 02/14/01
CTO: 0168
LOCATION: Alameda Point, California

FROM: Barna Szabo
& **Daniel Chow,** Program Manager

DOCUMENT TITLE AND DATE:

Final Operable Unit 3 Remedial Investigation Addendum Volume I - Response to Comments on the Alameda Point Draft Remedial Investigation/Feasibility Study Addendum

February 14, 2001

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TETRA TECH EM INC.

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Contract No. N62474-94-D-7609 Document Control No. DS . 0168 . 15877

TO: Mr. Richard Selby, Code 02R1
Contracting Officer
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street, Suite 1100
San Diego, CA 92132-5190

DATE: 01/29/01
CTO: 0168
LOCATION:
Alameda Point, California

FROM: Barbara Higgins
for **Daniel Chow,** Program Manager

DOCUMENT TITLE AND DATE:

Final Operable Unit 3 Remedial Investigation Addendum Volume I

January 27, 2001

TYPE: ☐ Contractual Deliverable ☒ Technical Deliverable ☐ Other

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DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 06CA.RW/0123
January 26, 2001

Mr. Phillip Ramsey
USEPA, Region IX.
75 Hawthorne Street
San Francisco, California 94105-3901

Subj: FINAL OPERABLE UNIT 3 REMEDIAL INVESTIGATION REPORT ADDENDUM, VOLUME I. ALADMEDA POINT, ALAMEDA, CALIFORNIA

Dear Mr. Ramsey:

This letter transmits the above-referenced document. Comments received from the Environmental Protection Agency and the California Environmental Protection Agency, Department of Toxic Substances Control have been incorporated into the final document. A summary of Navy responses to the comments is attached to this transmittal letter.

As summarized in a December 6, 2000, e-mail from Navy to the members of the BCT, the RI Report Addendum will be completed in three volumes. Volume I presents the results of data gap sampling completed at the 1943 to 1956 waste disposal area (Site 1). Volume II will present the revised radiological human health risk assessment and radiological closure report. The cumulative risk at the site, resulting from chemical and radiological waste, will also be presented in Volume II. Volume III will present the results of the Site 1 geotechnical characterization and UXO screening. If additional UXO removal at Site 1 is performed, Volume III will also document the removal process.

The three volumes that will comprise the RI Addendum are being developed as the necessary characterization and removal activities are completed. Volume I is being presented in compliance with the BCT-negotiated FFA schedules. Volume II will be submitted at a date to be determined, with the radiological removals agreed to at meetings held November 15 and 28, 2000, completed before submittal. Volume III will be submitted, in draft form by September 1, 2001.

Please feel free to contact me at (619) 532-0952 if you have any questions.

Sincerely,

RICHARD C. WEISSENBORN, P.E.
Remedial Project Manager

Enclosure: 1. Final Operable Unite 3 Remedial Investigation Report Addendum, Volume 1 Alameda Point, Alameda, California

5090
Ser 06CA.RW/0123
January 26, 2001

Copy to:
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Tetra Tech EM Inc.

10670 White Rock Road, Suite 100 ◆ Rancho Cordova, CA 95670 ◆ (916) 852-8300 ◆ FAX (916) 852-0307

January 26, 2001

Mr. Richard C. Weissenborn
Remedial Project Manager
Southwest Division
Naval Facilities Engineering Command
1230 Columbia Street, Suite 1100
San Diego, CA 92101-8517

Subject: **Final Operable Unit 3 Remedial Investigation Addendum Volume I, Alameda Point, Alameda, California CLEAN II Contract No. N62474-94-D-7609, Contract Task Order No. 168**

Dear Mr. Weissenborn:

Enclosed are five copies of the Final Operable Unit 3 RI Addendum Volume I, Alameda Point, Alameda, California. Copies of this document have been sent to other concerned parties in accordance with your transmittal letter and the approved distribution list.

If you have any questions or comments, please call me at (916) 853-4510. Thank you.

Sincerely,

Chris Fennessy

Chris Fennessy
Installation Coordinator

Enclosures

cc: File

DS.0168.15877

Tetra Tech EM Inc.

10670 White Rock Road, Suite 100 ◆ Rancho Cordova, CA 95670 ◆ (916) 852-8300 ◆ FAX (916) 852-0307

February 14, 2001

Mr. Phillip Ramsey
USEPA, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Subject: SUBMITTAL OF RESPONSE TO COMMENTS ON THE ALAMEDA POINT DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY ADDENDUM ALAMEDA POINT, ALAMEDA, CALIFORNIA
CLEAN II Contract No. N62474-94-D-7609, Contract Task Order 168

Dear Mr. Ramsey:

At the Navy's request, Tetra Tech EM Inc. (TtEMI) is pleased to submit the attached Response to Comments (RTC) on the Draft Remedial Investigation/Feasibility Study Addendum, Alameda Point, Alameda, California. The RTC should be included as an attachment to the Final Operable Unit 3 Remedial Investigation Addendum Volume I, submitted on January 27, 2001. The submittal is a result of your telephone conversation with Rick Weissenborn on February 8, 2001, regarding the additional investigations performed by the Navy at OU-3 and associated report documents for completeness. For further information please contact Rick Weissenborn at (619) 532-0952, or myself at (775) 333-8461.

Very truly yours,

Chris Fennessey

for Brian K. Dela Barre, Ph.D.
Project Manager

Cc: Rick Weissenborn (5)
Navy File
Diane Silva (3)
Steve Edde
TtEMI File
Chris Fennessey
Dan Baden
Dan Shafer
Mary Rose Cassa
Anna-Marie Cook
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RESPONSE TO COMMENTS ON THE ALAMEDA POINT DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY ADDENDUM ALAMEDA POINT, ALAMEDA, CALIFORNIA

REF	COMMENT	RESPONSE
Phillip Ramsey, Remedial Project Manager, EPA comments on the Alameda Point Draft OU-3 RI/FS Addendum, dated August 3, 2000		
GENERAL COMMENTS		
1	The Draft OU-3 RI Addendum documents the results of a data gap sampling investigation (primarily a groundwater and volatile organic compound (VOC)/methane soil gas assessment) and concludes that the landfill gas survey conducted as part of the investigation did not identify all areas at OU-3 that may have significant methane concentrations, and that an additional landfill gas investigation is necessary for remedial design. U.S. EPA generally agrees with the Navy's approach of completing an assessment of methane as a remedial design consideration.	No response required
2	It is not clear why a Human Health Risk Assessment (HHRA) for ambient air was performed as part of the investigation. There is no discussion of a HHRA in the work plan, and there is no discussion of the HHRA in OU-3 RI Addendum – Section 1.2, Purpose. Additionally, it is not clear how the OU-3 RI Addendum HHRA interfaces with the Risk Assessment presented in the August 1999 RI Report. The OU-3 RI Addendum should be revised to clarify why the HHRA for ambient air was performed, and whether the HHRA for ambient air is intended to supplement or replace the evaluation presented in the August 1999 RI Report.	Comprehensive risk assessment methodologies and results will be addressed in Volume II of the Operable Unit (OU)-3 Remedial Investigation (RI) Report.
3	In response to a cyanide (groundwater) data gap, the Navy sampled monitoring well M025A and report non-detected levels in groundwater. The Alameda Naval Air Station Restoration Advisory Board has indicated in writing to the Navy that at least one other well, M001-E, also has a historic detection of cyanide. Consistent with the original data gap sampling objectives in support of the RI, U.S. EPA believes the Navy must have recent sampling data for those wells with historic cyanide detections. If monitoring well M001-E had a similar sampling and detection history as well M025A, then the well should be sampled.	Cyanide was detected in samples collected from existing monitoring wells in 1991 and 1992. However, evaluation of the ecological risk associated with historic detection of cyanide was performed in the OU-3RI Report. This assessment indicated that cyanide concentrations detected in groundwater did not pose an unacceptable risk to aquatic receptors. COPCs were screened out if one of the following conditions applied to compounds detected during site investigation and characterization: (1) considered to be essential nutrients, (2) frequency of detection was less than 5 percent, (3) the concentration was lower than the background (for inorganics only) concentration, or (4) the maximum detected concentration was less than the EPA AWQC for saltwater aquatic life protection (4-day average continuous concentrations). In addition, detected constituents in groundwater were compared to ERVs in a sequential fashion. The EPC was compared to the ERV. If the value was less than the ERV, the compound was dropped. If the value was greater than the ERV, the value was divided by 10 and compared to the ERV to account for dilution from groundwater to surface water, as recommended by NOAA. If the EPC divided by 10 was greater than or equal to the ERV, the compound was retained as a COPC. M001-A was therefore not sampled based on two detections above the ERV. Therefore, no additional characterization using step-out samples to evaluate the area around M001-E is required. Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes.

RESPONSE TO COMMENTS ON THE ALAMEDA POINT DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY ADDENDUM ALAMEDA POINT, ALAMEDA, CALIFORNIA

SPECIFIC COMMENTS		
1	Section 1.0, Introduction: If available please cite U.S. EPA and DTSC work plan/QAPP approvals (note that due to short work plan review time, agencies may have only provided verbal approvals).	The Draft and Draft Final Field Sampling Plan and Quality Assurance Project Plan for Data Gap Sampling at OU-3, Alameda Point, went through regulatory agency review. Comments were not received regarding the Draft Final documents, thereby implying approval.
2	Section 1.1, Site Background and Appendix A, Aerial Photograph: Text makes reference to aerial photographs (1949 and 1957) with Appendix A being the 1949 photograph showing most of the operable unit. For completeness, U.S. EPA requests that the Navy include both photographs and any photographic interpretations available from the photos. U.S. EPA would be particularly interested if any details regarding waste disposal practices were noted. For example, casual review of the attached photograph indicates staining that may be wastes, on the roadways on the west (bay) side of the two northern cells. In site documents the Navy has mentioned trenches were used for waste disposal, therefore, based upon Navy photographic interpretation, please indicate what photograph(s) reveal.	Appendix A presents both aerial photographs referred to in OU-3 RI Addendum Volume I. No identification of trenches used for disposal was apparent upon review. No additional interpretation is available, because any conclusions from interpretation of the photographs would be speculation. Extensive investigations have been performed at OU-3, which provide current information regarding extent of contamination.
3	Section 1.1: On page 1-4, please change the first sentence to read, "Under U.S. EPA Guidelines for Groundwater Classification (EPA, 1988), the aquifer at OU-3 is currently designated Class II (groundwater which is a current or potential source of drinking water and a water that has other beneficial uses), but is not intended for future use as a drinking water source in this area."	The text has been modified, as requested. The Determination of The Beneficial Uses of Groundwater at Alameda Point Report was also referenced in the report.
4	Section 1.2.2, Groundwater: In response to cyanide data gaps, the Navy sampled monitoring well M025A and report non-detected levels in groundwater. The Alameda Naval Air Station Restoration Advisory Board's June 2, 2000, OU-3 RI Addendum comments indicated that at least one other well, M001-E, also had a historic detection of cyanide. Consistent with this original data gap sampling objective, U.S. EPA believes the Navy must have recent sampling data for those wells with historic cyanide detections before it can complete the FS.	See general comment 3 response.
5	Table 1-1, Data Quality Objectives: While collection of VOC soil gas data were part of an assessment of landfill gas generation, the VOC soil gas sampling activity also provided an indirect assessment of potential VOC groundwater contamination within the landfill. Therefore, for Data Gap Number 2, Groundwater Extent of Contamination, please add "soil gas data" to the third column "Identify the Inputs to the Decision."	Table 1-1 has been modified, as requested.
6	Figure 1-3, OU-3 Groundwater Sampling Locations. Please expand content of figure to include soil gas sampling locations (also distinguish those soil gas sampling locations also measured for flux chamber gas).	Figure 1-3 has been modified, as requested.
7	Figure 2-3, OU-3 Groundwater Historic Concentration of COCs at Monitoring Well M028-A. To make this figure more informative, please modify to clearly indicate the month/year samples were collected and provide the contaminant concentration or provide an accompanying table that provides month/year of sampling date and contaminant concentrations (both of which are difficult to interpret from the figure). Also, the figure needs a line connecting the December 1999 30,000 µg/l 1,2-dichloroethylene detection.	A revised Figure 2-3 has been presented in the document. The figure now includes the date of sample collection and concentrations detected in a data table included in the figure.

8	Figure 2-3. U.S. EPA notes that well M028A went from 10,000 µg/l in September 1991 down to less than 20 µg/l during the next sampling period. Has the Navy noted this unusual fluctuation and have a possible explanation.	This change could be due to dilution from groundwater recharge or it could be indicative of a vadose zone source. Groundwater levels during the sampling periods will be further examined . Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes.
9	Section 2.1.1, Groundwater Shoreline Sampling: The first paragraph in this section makes an initial reference to ecological reference values (ERVs) without defining or explaining them. Please revise the text to include an explanation of ERVs.	The text has been modified, as requested.
10	Section 2.1.3, Groundwater Verification Sampling: On page 2-12 the Navy needs to provide a justification or rationale to support statements that groundwater extraction and ex situ treatment (Remedial Alternative or RA 8) and in situ air sparging (RA 10) would be affected by inorganic chemistry parameters. For an impermeable vertical barrier (RA5), the Navy indicates that inorganic chemistry parameters would not prohibit consideration of the barrier due to corrosion. The justification should include a discussion of the concentrations of inorganic parameters that would affect the operation of these RAs and a demonstration that the concentrations of inorganic parameters detected in OU-3 groundwater are below those concentrations.	Evaluation of how groundwater chemistry may affect remedial alternatives will be presented in the Revised Draft Feasibility Study (FS) Report.
11	Section 2.2.1, Landfill Gas Survey: The last paragraph on page 2-14 and the first paragraph on page 2-16 state that analytical results for methane did not compare well between the field and fixed laboratory, and a comparison of VOC results between field and fixed laboratory analyses did not provide evidence of precision due to an abbreviated list of target analytes for field analyses and due to high detection limits in the laboratory. The second paragraph on page 2-16 states that the quality of the field results was questionable and that an additional landfill gas investigation will be necessary for efficient design of a landfill containment and venting system. However, it appears that the sample collection and sample analytical protocols that were followed were consistent with the FSP. Please clarify why the sample collection and sample analytical protocols proposed in the FSP and performed during the investigation were not adequate to achieve one of the investigation's objective, i.e., determine methane and VOC concentrations present in soil gas and evaluate proposed containment venting options.	The text of the OU-3 RI Addendum has been modified to include an expanded explanation of lack of reproducibility between field analyses and verification samples. Inconsistent collection method, sample volume, and sample container used for samples submitted to field and fixed laboratory appears to be the cause of non-reproducible data. A long-term landfill gas monitoring system will be installed and monitoring will be performed before and after installation of the remedial system.
12	Section 2.2.1.1, Methane: While U.S. EPA disagrees with the statement "[c]haracterization of landfill gas is required at landfill sites to assess the presence of methane in concentrations above the lower explosive limit (LEL(5.5% v/v) and below the upper explosive limit (UEL)(14% v/v) (emphasis added), we understand that the Navy has investigated and will continue to assess methane generation for remedial design consideration. Therefore, the Navy may want to change this text to better reflect its approach. Further, U.S. EPA submits the following comment regarding methane assessment: A. Per RCRA CFR 258.23(a) the methane standard is a maximum of 5% at facility boundary (landfill limit) and 1.25% (25% LEL) in facility structure (buildings, pipings).	The text has been modified, as requested. In addition, the Code of Federal Regulations has been referenced, accordingly.

13	Section 2.2.2, Flux Chamber and Figure 1-2, Physical Features: The referenced figure does not illustrate the soil gas sampling locations as indicated in text. As indicated above, a modified Figure 1-3 or separate figure is needed to illustrate soil gas sampling locations and collection types (i.e., flux chamber – summa canisters/fixed lab, soil gas syringe/mobile lab, soil gas summa canister/fixed lab).	Figure 1-3 has been modified, as requested.
14	Section 2.2.2.2, VOCs: If U.S. EPA were to establish a concentration or level of concern which could be an ecological cleanup number, the value of 5,470 ug/l or 5.4 mg/l would be acceptable. Since all detections are well below this value, there is no need to set a cleanup level.	This discussion has been removed from the document text.
15	Figure 2-6, OU-3 Surface Flux VOCs: The figure title indicates that VOC surface flux data are being presented; however, the legend indicates that the data units are mass per volume. Flux data implies an element of time, which is not indicated in this explanation of the units.	Figure 2-6 has been modified, as requested.
16	Section 3.0, Human Health Risk Assessment for Ambient Air: While the Navy states in the OU-3 RI Addendum HHRA that it is intended to augment the HHRA presented in August 1999 RI, there is no explanation regarding how this HHRA augments the RI HHRA. For example risks due to inhalation were already calculated in the RI. If the OU-3 RI Addendum is intended to supersede the inhalation risk calculations presented in the August 1999 RI, this should be clearly stated. Additionally, because the RI HHRA included an evaluation of other exposure pathways (i.e., ingestion and dermal contact), the results of these risk calculations and the sum of the risks from these different pathways should be presented in the RI Addendum HHRA, in order to provide an evaluation of the cumulative risks present at the site.	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.
17	Section 3.0, Human Health Risk Assessment for Ambient Air, p. 3-1: The first paragraph in this section states that the methodology used in the HHRA is consistent with *Risk Assessment Guidance for Superfund (RAGS) Volume 1, Human Health Evaluation Manual, Part B* (USEPA, 1989). Please revise the OU-3 RI Addendum to use current guidance which is presented in U.S. EPA Region 9 October 1, 1999, Preliminary Remedial Goals in preparation of the HHRA.	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.
18	Section 4.0, Effects of Results on Feasibility Study Remedy Selection: The third bullet on indicates groundwater did not exceed a 5.9 mg/l ecological reference value criteria and "the eastern boundary of the groundwater hot spot was identified." In a general sense, U.S. EPA agrees that the groundwater hot spot was assessed during the data gap sampling. However for completeness, the Navy should recognize that both U.S. EPA and DTSC asked the Navy to utilize some of its contingency groundwater samples to assess the eastern extent of groundwater contamination and the Navy refused this request.	The Navy used decision criteria presented in the OU-3 Data Gap Sampling FSP/QAPP Report to define step-out boundaries.
19	Section 3.1, Box Model, p. 3-2: The first sentence of this section lists the ambient air mixing height as 1.5 meters, while in the IR HHRA, the ambient air mixing height is listed as 200 centimeters (Table C.5.4-9). Please revise the RI/FS addendum to provide a reference for the use of 1.5 meters for the height of the mixing layer (z) employed in the box model (e.g., the height of the breathing zone for a typical adult receptor).	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.

20	Section 3.2, Sitewide Ambient Air, p. 3-5: The last paragraph of section 3.2 indicates that flux chamber sample concentrations for each analyte were compared to ambient air preliminary remediation goals (PRGs), and Table 3-1 indicates that 15 of the 22 analytes detected in soil gas were excluded from further evaluation, because they were below the ambient air PRGs. This approach ignores the concept of cumulative exposure to multiple contaminants. Given that the Hazard Index (HI) for the sitewide evaluation is 0.9, and that this HI was calculated after many of the VOCs were eliminated, the conclusion in Section 3.4.1 that the total hazard for the site is less than 1 may not be appropriate. Please revise the RI addendum to include all detected analytes in all steps of the HHRA.	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.
21	Section 3.4, Human Health Risk Assessment Results, p. 3-8: There are several statements in this section that the risk at OU-3 is overestimated based on the use of residential PRGs for a site that will only have recreational users. Please revise the RI addendum to provide specific information regarding why the exposure assessment for residential use would be conservative for a site that only has recreational users (i.e. how the exposure assumptions for these different receptors vary).	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.
22	Section 3.4-3.4.2, p. 3-13: The references to USEPA's "acceptable risk range" on this page represent risk management decisions and should not be included as part of the HHRA. The purpose of the risk assessment is to characterize and quantify risk at the site. The determination of what constitutes an "acceptable" level of risk is part of the risk management process, and should be considered after the application of the nine-criteria analysis specified by the National Contingency Plan. Please revise the HHRA to eliminate these references to USEPA's acceptable risk range.	Volume II of the OU-3 RI Report Addendum (forthcoming) will present RI comprehensive risk assessment results and directly address this comment.
23	Appendix B. Many of the lab sheets indicate groundwater sampling depths of "0.00-0.00" (see for example samples 122-S01-119 and 122-S01-121). Please explain or correct.	Screened intervals for the wells are stated in the report text.
24	Appendix C, Soil Gas Investigation: This appendix discusses the analysis of landfill gas samples in the on-site mobile laboratory, but does not mention verification analyses in a fixed laboratory. In Section 2.2.1 text states that verification samples were analyzed at a fixed laboratory; however, there is no discussion of the sampling methods or sample handling procedures for the fixed laboratory samples, or the analytical procedures used by the fixed laboratory. Given the inconsistency between the results from the mobile laboratory and the fixed laboratory, and that this inconsistency has resulted in the investigation failing to achieve one of its main objectives, a discussion of the procedures for the fixed laboratory sample collection, handling and analytical procedures is necessary to evaluate the reasons for the inconsistencies in the two types of sample results. Please revise the RI Addendum to include a section discussing the procedures used for the collection, handling and analysis of the fixed laboratory samples. This evaluation should help to ensure that future methane assessments will achieve the Data Quality Objectives (DQOs).	The text has been modified to include an expanded explanation of quality control sample collection and results.
Department of Toxic Substances Control, Comments on Draft OU-3 RI/FS Addendum dated April 13, 2000		
GENERAL COMMENTS		
1	DTSC concurs with the method and the data quality objectives developed, using the seven-step process outlined in the "Guidance for the Data Quality Objective Process," to address the five data gaps identified at the site. The Addendum has used this process to collect the appropriate quantity and provide qualified samples necessary to generate the data required to meet DQOs as presented in Table 1-1 of the Addendum.	No response required

2	DTSC generally concurs with the conclusions made in Section 4.0 of the Addendum on the effects the results will have on the feasibility study remedy selection. DTSC concurs with the Addendum and strongly recommends the implementation of an additional landfill gas investigation before final containment design. Specifically, DTSC is concerned about the documentation of vadose zone soil gas levels of 1500 ug/m^3 for vinyl chloride (VC) at SG-S01-B9-03 as reported in Table 2-6 of the Addendum. Although VC was not detected in flux chamber studies at this location, analytical results of VC for this location are orders of magnitude higher than for ethylbenzene and o-xylene which are detected in flux chamber results for this location. This would appear to indicate that VC may migrate vertically and become a risk issue for surface receptors at this site.	A long-term landfill gas monitoring system will be installed and monitoring will be performed before and after installation of the remedial system.
3	On page 2-4 and 2-5 it is indicated that although naphthalene and phenanthrene were detected above the ecological reference screening value that the risk to ecological receptors in the Bay is unlikely. Part of the logic for this is that elevated concentrations are very limited in areal extent, and levels at which impacts would be expected to occur as a result of naphthalene are an order of magnitude greater than the screening level. It is possible that higher concentrations of these constituents are present immediately upgradient of the location where this shoreline sample was collected if this sample location is downgradient of the source. DTSC recommends that consideration be given to monitoring groundwater at the potential elevated naphthalene and phenathrene concentration area to ensure that concentrations do not increase either as the result of seasonal fluctuation or the result of higher concentrations flowing with groundwater from a source upgradient.	Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes.
4	The text at the top of page 2-8 indicates that COC results are posted on Figure 2-2 for the primary sample locations. It appears on Table 2-3 concentrations of benzene, vinyl chloride, ethylbenzene, toluene, naphthalene, 1,2-dichlorobenzene, methylnaphthalene, and acenaphthene were detected; however, these concentrations are not included on Figure 2-2. These concentrations should be posted on Figure 2-2.	Figure 2-2 presents detected concentrations of COCs identified in the ecological risk assessment in the OU-3 RI Report. Compounds listed in this comment, with the exception of xylene, were not identified as COCs.

5	1,2-DCE was detected in the groundwater samples collected from the upgradient hot spot boring HP-SO1-B11 at concentrations ranging from 16 to 64 ug/L. These concentrations are much less than the 1,2-DCE concentration detected in groundwater from hot spot well MO28A (32,000 ug/L). The presence of 1,2-DCE at HP-SAO1-B11 may be the result of diffusion from the hot spot to the upgradient location or it could be the result of a release from a location that is upgradient of HP-SAO1-B11. Another observation is that the vinyl chloride concentration may have increased significantly from the last sampling round of MO28A. The latest concentration is 48,000 ug/L. In July 1995 the vinyl chloride concentration was 340 ug/L and the 1,2-DCE was at a concentration of 27 ug/L. Concentrations of 1,2-DCE and vinyl chloride for MO28E during 7/95 were 110,000 and 16,000 ug/L, respectively. It appears that the vinyl concentrations may be increasing as a result of reductive dechlorination of 1,2-DCE to vinyl chloride. According to Table 2-3 there is no ecological reference value for vinyl chloride. This is of potential concern as the vinyl chloride concentrations are very high and could continue to increase as result of reductive dechlorination. Consideration should be given to assessing a source for VOCs to the east of HP-SO1-B11 and implementing long term monitoring at HP-SO1-B11 if reductive dechlorination and/or advection is resulting in unacceptable levels of vinyl chloride at this area. It is important to note that contaminants onsite from sources upgradient of Site 1 could be remediated in a system constructed at the hot spot. Section 3, Human Health Risk Assessment for Ambient Air, states that this information is intended to augment the HHRA presented in the final remedial investigation report. It is important that all relevant information regarding human health risk assessment be presented in a single report that addresses all sources of risk. The overall risk for OU3 will not be accurately assessed until risks from volatile organic compounds, radiation, and UXO are compiled in one report.	The Navy agrees that it is possible that higher concentrations may be found upgradient in a landfill situation. Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes. Volume II of the OU-3 RI Report Addendum (forthcoming) will present comprehensive risk assessment results. UXO is a technical safety issue, not a human health or ecological risk driver.
8	One of the recommendations of the Draft RI/FS is landfill gas monitoring over several quarters. Two quarters have elapsed since the sampling reported here was completed. What plans are in place to expedite this ongoing quarterly monitoring in support of the remedial design?	A long-term landfill gas monitoring system will be installed and monitoring will be performed before and after installation of the remedial system.
SPECIFIC COMMENTS		
1	The dates of the datagap sampling are not readily apparent in the introductory text. This information would help put this report into context within the scope of the OU3 RI/FS/ROD sequence. Furthermore, it would be easier to compare historic concentrations of COCs at Monitoring Well MO28A (Figure 2-3) if specific collection dates were noted.	The text and Figure 2-3 have been modified, as requested.
2	Vinyl Chloride is shown in Table 2-6 as 1500 ug/m^3 at SG-SO1-B9-3 while it is not shown on Figure 2-4, OU-3 Landfill Gas, for the same location, nor is this level of VC, 1500 ug/m^3, used in the risk assessment analysis shown in Table 3-2 of the Addendum. This issue requires resolution prior to use of these risk assessment results.	Figure 2-4 has been modified, as requested. Volume II of the OU-3 RI Report Addendum (forthcoming) will present comprehensive risk assessment results.
3	Figures 2-5 and 2-6 are entitled "Surface Flux," but data posted on Figure 2-6 are shown as concentration (ug/m^3). Please correct.	Figures 2-5 and 2-6 have been modified, as requested.
4	Please consider showing the former burn area on all maps, particularly on the soil gas/flux maps, to facilitate evaluation of data relative to this historic activity.	All Figures in Section 2 have been modified, as requested.

Department of Toxic Substances Control Comments Draft HHRA in Support of Remedial Action Objectives for Radiological Materials at OU-3 dated May 22, 2000		
1	It is important that all relevant information regarding contamination and human health risk assessment be presented in a single report that addresses all sources of risk. The overall risk for OU3 will not be accurately assessed until risks from volatile organic compounds, radiation, and UXO are compiled in one report.	Volume II of the OU-3 RI Report Addendum, the Risk Assessment and Radiological Closure Report, will include the revised Radiological HHRA and corresponding response to comments. These documents will be finalized following removal of radiological anomalies above about 10,000 counts per minute, previously identified at the site. In addition, the final version of Volume II will present comprehensive human health and ecological risk assessment ERA results for chemical and radiological items remaining at the site. This risk assessment will provide a summation of the individual cancer and noncancer risk values to allow complete evaluation of risk to human and ecological receptors. Unexploded Ordnance (UXO) removal will be documented in Volume III of the RI Addendum.
2	Please refer to U. S. EPA Office of Solid Waste and Emergency Response (OSWER No. 9200.4-18, August 22, 1997): Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination. DTSC recommends the use of the OSWER 15 mrem radiation standard instead of 25 mrem.	Volume II of the OU-3 RI Report Addendum, the Risk Assessment and Radiological Closure Report, will include the revised Radiological HHRA and corresponding response to comments.
3	The Area Adjustment Factor is a valid concept, but it can be viewed as a manipulation to make the risk appear lower. To facilitate evaluation of the appropriateness of the AAF used in the report (the proposed golf course area), it would be helpful to also use the area of OU3 in the calculation. This area would be the largest potential area affected by radiation, as determined by the surveys and delineated by the most recent OU boundary configurations.	Volume II of the OU-3 RI Report Addendum, the Risk Assessment and Radiological Closure Report, will include the revised Radiological HHRA and corresponding response to comments.
4	Because the exposure of future receptors would be dictated by the use of the planned golf course, it might be appropriate to consider including monitoring after the golf course is completed. This would allow evaluation of areas where receptors would spend more time (e.g., tees, greens).	Postclosure monitoring will be addressed in the Revised Draft FS Report.
5	The text on page 9 (Exposure Setting and Potential Receptors) make reference to a "thin layer of topsoil." Based on the Draft OU3 RI/FS Addendum, the soil cover is approximately two feet thick.	Volume II of the OU-3 RI Report Addendum, the Risk Assessment and Radiological Closure Report, will include the revised Radiological Human Health Risk Assessment (HHRA) and corresponding response to comments.
Department of Health Services, Review of Draft HHRA in Support of Remedial Action Objective for Radiological Materials at OU- 3, Alameda Point, dated May 22, 2000		
1	This document was reviewed to ensure that the requirements of the California Code of Regulations, Title 17, have been or will be met once the property is no longer under federal jurisdiction. This document indicates that discrete sources of radioactive materials will not be removed prior to use of the property for recreational purposes. Because radioactive material will remain at the site after transfer, the requirements of Title 17 must be met. It is not clear whether the site will require a license from the Radiologic Health Branch (RHB), or, if a restricted release can be achieved under the new federal regulations (Radiological Criteria for License Termination, 10CFR20.1400, *et seq.*). We suggest that you work closely with the RHB, the DHS branch responsible for licensing decisions. An initial point of contact, David Wesley, Sr. Health Physicist, can be reached at (916) 445-1884 (Dwesley@dhs.ca.gov).	Volume II of the OU-3 RI Report Addendum, forthcoming, will present RI comprehensive HHRA results and directly address this comment.
Melissa K. Gunter, Waste Management Engineer, California Integrated Waste Management Board		
1	Board staff agrees with the conclusion that, before the final containment system is designed, periodic monitoring and an additional landfill gas investigation are necessary in areas where methane detection was above one percent.	A long-term landfill gas monitoring system will be installed and monitoring will be performed before and after installation of the remedial system.

Ken Kloc, OU-3 Focus Group member and Arc Ecology employee		
1	Inappropriate use of a dilution factor for surface water screening values The Navy proposes to multiply various marine wildlife screening values, such as the Marine Ambient Water Quality Criteria (AWQC), by a factor of 10, in order to come up with site-specific marine wildlife screening criteria. According to the Navy, this procedure is based upon NOAA recommendations. Two comments on this issue: First, the Navy does not cite an NOAA technical document supporting the use of a dilution or attenuation factor. Indeed, according to the OU-3 RI, the NOAA has no official methodology which defines the use of an attenuation factor of 10 for the screening of groundwater discharges. Second, the appropriate screening procedure for the groundwater-to-surface water pathway should be the RWQCB's procedure. However, the Water Board does not use a dilution factor for shallow water discharges to the Bay, and does not use an attenuation factor for groundwater concentrations measured within 300 feet of the Bay shoreline. Since the Navy's shoreline wells are within 300 feet of the shoreline, the Navy should use unadjusted screening criteria in its analysis. This would result in the identification of additional areas of problem contamination in shoreline groundwater at OU-3.	The text of the OU-3 RI Addendum has been modified to include an expanded explanation of the ecological reference value (ERV) development using standard National Oceanic and Atmospheric Administration (NOAA) practice. The requested reference is included below: Buchman, M.F. 1999. NOAA Screening Quick Reference Tables. NOAA HAZMAT Report 99-1. Seattle, WA. Coastal Protection and Restoration Division. National Oceanic and Atmospheric Administration. 12 Pages. September. In addition, the San Francisco Regional Water Quality Control Board does not consistently require a 300-foot buffer zone. For instance, the Navy's ongoing preparation of the corrective action plan for Alameda Point presented scientific justification for not requiring any buffer zone for migration of total petroleum hydrocarbons in groundwater and discharge to surface water.
2	Need to consider AWQC (Human Health for Consumption of Organisms) Given that a significant stretch of the current OU-3 shoreline is destined to become a recreation area at which fishing and shellfishing may take place, the AWQC (Human Health for Consumption of Organisms) are relevant to the remedial action. These AWQC values should be reported in the RI/FS Addendum and they should be considered in developing cleanup goals for groundwater.	The sediment work group is evaluating risks associated with all sediments and offshore areas, including areas adjacent to OU-3. Therefore, evaluation of AWQC (Human Health for Consumption of Organisms) will be deferred to the sediment work group and will not be addressed in the OU-3 RI Report.
3	Need to consider EPA Region 4 screening values for marine water EPA Region 4 has compiled a list of screening criteria for marine surface water. For the chemicals of concern at OU-3, several of these EPA Region 4 values are lower than those that the Navy developed. These values should be reported in the RI/FS Addendum and considered relevant in developing cleanup goals for groundwater at OU-3.	Region 4 screening levels were considered in developing the ERV when EPA National Ambient Water Quality Criteria for Saltwater Aquatic Life Protection (4-day average continuous concentration) were not available.

4	Additional groundwater hotspots The Navy is proposing active groundwater remediation at only one limited portion of the landfill boundary (the region of the chlorinated volatile organic hotspot). However, both monitoring well data from the OU-3 RI and the recent groundwater grab samples from the RI/FS Addendum show that there may be other hotspots of petroleum and PAHs along the northwest area of the OU-3 shoreline. For example, total petroleum hydrocarbon (TPH) concentrations in groundwater near the former oil sump area were elevated above the Water Board's 1.4 mg/L TPH level for discharges to surface water (see table below). (n.b. Both soil and groundwater data at the Former Oil Sump are quite limited; for example, note the lack of data more recent than 1992 at Well M029A. Also, there are only four soil borings at the oil sump area, and it is unclear whether these borings have sufficiently characterized the sump.)	The elevated total petroleum hydrocarbon (TPH) concentrations measured at Well M029-A would fall below the 14 milligram per liter (mg/L) ERV, using the factor of 10 dilution applied to AWQC for other constituents. Two polynuclear aromatic hydrocarbons (PAH), phenanthrene and naphthalene, were detected above their ERVs. The report text presents the development of the ERV for each of these compounds. In addition, the text explains that the limited areal extent of these compounds limits the exposure point concentration (EPC) that aquatic receptors are likely to be exposed to as a result of groundwater discharge to the Bay. Therefore, the chemical characterization is complete for PAHs in groundwater near the northwestern portion of the site and will not delay the Navy proceeding with the revised Draft FS. However, existing monitoring wells in this area will be considered for inclusion in the groundwater long-term monitoring plan.
5	Quantity of sampling required to close data gaps The Navy appears to assume that the single additional round of samples collected for the RI/FS Addendum provides sufficient data to address the various data-gap issues, such as the question of whether cyanide is present in Well M025A, or whether 1,4-dioxane is present in groundwater, or whether other hotspots exist at various shoreline grab sample locations. Given the level of variability demonstrated by the shoreline monitoring wells over time, we recommend, at a minimum, four quarters of sampling.	Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes. 1,4-Dioxane was detected at six locations during the data gap sampling surface flux investigation. The Draft RI/FS Addendum states on Page 2-28 that this compound was not included as a target analyte in previous groundwater investigations at OU-3. Therefore, there was concern that the source of this compound in ambient air could be a result of volatilization from groundwater in these locations. However, the Navy performed a follow-up groundwater sampling event of existing monitoring wells at OU-3 and did not detect 1,4-dioxane (<200 micrograms per liter [µg/L]). Complete analytical results are presented in the RI Addendum, Appendix B, and report text has been modified accordingly.
6	Soil gas flux measurements a. The flux measurements taken at the landfill may not be representative of average overall flux of VOCs from the landfill surface. The flux study was carried out four days after a several-day period of rain. As such, infiltrating rain water may not have had enough time to dissipate from the upper layers of soil, resulting in an uncharacteristically low soil porosity and vapor flux rate. In addition, since soil flux can also be affected by variations in barometric pressure, the RI should analyze the potential impact that this factor may have had, both prior to, and during, the flux study. b. The soil gas and flux measurements should be complemented with down-wind ambient air samples taken for the most conservative atmospheric conditions expected at the site.	The Navy agrees that this is a valid comment. Gas monitoring to be conducted prior to the remedial action will take barometric pressure and ambient air quality into account.

Technical Services for Committees comments on the Alameda Point Draft OU-3 RI/FS Addendum, dated April 13, 2000		
DATA GAPS		
1	The stated purpose of the RI/FS Addendum is to provide additional environmental characterization so that the Navy can proceed with the draft final FS. There are five specific data gaps to be addressed by this Addendum. It appears that even if these data gaps are addressed, the RI will still be incomplete. A radiological risk assessment, a UXO survey and investigation, and potentially additional work resulting from future investigation of IR-2 (the West Beach Landfill) are still to be conducted at Site 1. Neither the RI nor the FS can be completed until this work is finalized.	Volume II of this Addendum, forthcoming, will present results of radiological removal and HHRA revision. Volume III of this Addendum, forthcoming, will present results of UXO removal and geotechnical characterization.
2	Cyanide was detected in groundwater in 5 of 16 locations in 1991-92. Only one location, M025-A, was resampled during this Addendum effort. No cyanide was detected at MO25-A during this round of sampling; however, due to historical concentrations above the 10 ppb ERV, the Navy should conduct step-out sampling around MO25-A to ensure that the extent of contamination has been defined. In addition, cyanide was detected at MOO1-E in 1991-92 above the ERV, but no further sampling for cyanide was conducted in the northwest area of OU-3. Step-out sampling should be conducted around MOO1 to define the extent of cyanide contamination.	Cyanide was detected in samples collected from existing monitoring wells between 1991 and 1992. However, evaluation of the ecological risk associated with historic detection of cyanide was performed in the OU-3 RI Report. This assessment indicated that cyanide concentrations detected in groundwater did not pose an unacceptable risk to aquatic receptors. COPCs were screened out if one of the following conditions applied to compounds detected during site investigation and characterization: (1) considered to be essential nutrients, (2) frequency of detection was less than 5 percent, (3) concentration was lower than the background (for inorganics only) concentration, or (4) the maximum detected concentration was less than the EPA AWQC for saltwater aquatic life protection (4-day average continuous concentrations). In addition, detected constituents in groundwater were compared to ERVs in a sequential fashion. The EPC was compared to the ERV. If the value was less than the ERV, the compound was dropped. If the value was greater than the ERV, the value was divided by 10 and compared to the ERV to account for dilution from groundwater to surface water, as recommended by NOAA. If the EPC divided by 10 was greater than or equal to the ERV, the compound was retained as a COPC. M001-A was therefore not sampled based on two detections above the ERV. Therefore, no additional characterization using step-out samples to evaluate the area around M001-E is required. Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes.
3	The area south of MO26-A to the boundary of Site 1 has no sampling points identified in the Addendum. This appears to be an area that has not been characterized, which results in another data gap.	The area south of monitoring well M026 was not referred to the Installation Restoration program during the Environmental Baseline Survey investigation, nor has monitoring well data collected during the OU-3 investigation suggested that this area poses a threat to human or ecological receptors. Therefore, the Navy feels that no additional characterization of this area is necessary.
4	The northwest area of Site 1 requires additional groundwater characterization. Table 2-1 of the Addendum shows elevated concentrations of several PAHs in groundwater at sample point HP-SO1-B3. In addition, the RI indicates that elevated concentrations of Total Petroleum Hydrocarbons were detected in 1992 in the oil sump area (MO29-A), yet no sampling for TPHs in groundwater has occurred in this area since that time. Potential adverse effects to aquatic receptors cannot be fully determined until the nature and extent of chemical releases to the Bay are determined.	Two PAHs, phenanthrene and naphthalene, were detected above their ERVs. The report text presents the development of the ERV for each of these compounds. In addition, the text explains that the limited areal extent of these compounds limits the EPC that aquatic receptors are likely to be exposed to as a result of groundwater discharge to the Bay. Therefore, the chemical characterization is complete for PAHs in groundwater near the northwestern portion of the site and will not delay the Navy proceeding with the revised Draft FS. Elevated TPH concentrations measured at Well M029-A would fall below the 14 mg/L ERV, using the factor of 10 dilution applied to AWQC for other constituents. Long-term groundwater monitoring will be implemented at OU-3. Organic and inorganic chemicals will be included as target analytes.

5	TOSC concurs with the Addendum conclusions on pages 2-16 and 2-18 regarding the need for additional landfill gas investigation, including sampling protocols and analytical techniques consistent with the best available technology, and sampling conducted over several quarters to evaluate conditions.	A long-term landfill gas monitoring system will be installed and monitoring will be performed before and after installation of the remedial system.
6	Concentrations of 1,4-dioxane were detected at seven surface flux locations, which were spread over a wide area of Site 1. However, groundwater at Site 1 has not been analyzed for 1,4-dioxane. All FWBZ monitor wells should be sampled to determine whether 1,4-dioxane is present in groundwater at Site 1.	1,4-Dioxane was detected at six locations during the data gap sampling surface flux investigation. The Draft RI/FS Addendum states on Page 2-28 that this compound was not included as a target analyte in previous groundwater investigations at Site 1. Therefore, there was concern that the source of this compound in ambient air could be a result of volatilization from groundwater in these locations. However, the Navy performed a follow-up groundwater sampling event of existing monitoring wells at OU-3 and did not detect 1,4-dioxane (<200 µg/L). Complete analytical results are presented in the RI Addendum, Appendix B, and report text has been modified accordingly.
DATA QUALITY		
7	In evaluating the Addendum groundwater sampling effort in conjunction with other Site 1 investigation activities for overall completeness, Tables 6-31A and 6-31B of the August 1999 RI were reviewed. These tables summarize groundwater contaminant detections in the FWBZ at Site 1 from 1993-1998. There are several contaminants, primarily PAHs and inorganics, for which the percentage of reporting limits that exceeded ERVs is quite high, up to 100% in some cases. It appears that some data may have been inappropriately screened out of the COPC determination. The Navy should address this issue in the ecological risk assessment.	The Navy acknowledges that the reporting or detection limits for some of the data, particularly PAHs, were significantly above screening levels. As part of the ERA, however, for every non-detected value, a 95 UCL concentration was developed using reported values in conjunction with one-half of the method-reporting limit (MRL) for each non-detect. This EPC was compared to the ERV. For those that had all non-detect with MRLs above the ERV, a 95 UCL was developed using one-half of the MRL.
ECOLOGICAL RISK ASSESSMENT		
8	The Addendum does not discuss how Tentatively Identified Compounds (TICs) listed in Appendix B were addressed in the risk assessment for aquatic receptors. If TICs are omitted from the quantitative risk assessment, the justification should be documented in the ecological risk assessment discussion.	Comprehensive risk assessment methodologies and results will be addressed in Volume II of the OU-3 RI Report Addendum.
9	In defining groundwater screening criteria for aquatic receptors, the Navy multiplies whatever screening factor it deems most appropriate for each specific chemical by a factor of 10 to account for dilution from groundwater to surface water. The Addendum states that this methodology is recommended by NOAA. Where is the specific reference for this recommended method for determining groundwater-to-surface water screening criteria? Please provide documentation that this is an EPA Region 9 and Cal-EPA sanctioned practice.	Groundwater screening criteria were selected based on the quality of screening values, which included number of species tested and methodologies. The text of the OU-3 RI Addendum has been modified to include an expanded explanation of the ERV development using standard NOAA practice. The requested reference is included below and was added as a reference in the document: Buchman,M.F. 1999. NOAA Screening Quick Reference Tables. NOAA HAZMAT Report 99-1. Seattle, Washington. Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration. 12 Pages. September.
10	The August 1999 RI for OU-3 cites EPA Region 4 water quality screening values as "Alternative Reference Values" for ecological risk assessment (Tables 6-31A and 6-31B). These values should also be included in assessment of ecological risk in the Addendum and used to determine remediation concentrations for groundwater at Site 1.	Region 4 screening levels were considered in developing ERVs when EPA National Ambient Water Quality Criteria for saltwater Aquatic Life Protection (4-day average continuous concentration) were not available.

REF	COMMENT	RESPONSE
Environmental Protection Agency comments from Phillip Ramsey, Remedial Project Manager, on the Alameda Point Draft Final Operable Unit-3 (OU-3) Remedial Investigation (RI) Addendum, Volume 1, dated January 18, 2001		
GENERAL COMMENTS		
1	The Navy's response to this comment (Please refer to response to EPA General Comment #3 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000) is conditionally acceptable. In its response, the Navy list five (5) conditions whereby COPCs were screened out. One of these conditions is that the COPC is "considered to be essential nutrients." Though generally this is an acceptable condition, the Navy should keep in mind that at elevated levels of some nutrients may become toxic. In addition, the Navy, in its cover letter dated December 12, 2000, states that cumulative risk will be addressed in Volume II. U.S. EPA reserves the right to reevaluate this response based on a review of Volume II. In addition, it is inappropriate to screen out COPCs based on a less than 5% detection rate. RAGS Part A presents an example where COPCs were screened out based on a less than 5% detection rate, however this is not policy or guidance. COPCs that the Navy wishes to screen out based on frequency of detection should be analyzed carefully to assure that i) the detections are not indicative of hot spots which pose a threat in of themselves, and ii) the detections are not grouped spatially indicating a release. For example, if there are 300 analyses for compound X with a PRG of 10, it would be inappropriate to screen compound X out if there were 4 detections at concentrations of 1000 or if there were 9 detections at 50 all grouped around a potential release area. Please reassess all COPCs that were eliminated based on low frequencies of detection and assure that none that pose potential threats to human health or the environment were inadvertently screened out.	The Navy understands that essential nutrients can become toxic at very high concentrations and has followed accepted screening criteria to evaluate these compounds. Toxicity values for human or ecological risk assessment consideration have not been developed for compounds considered to be essential nutrients. The following excerpts from the OU-3 Remedial Investigation Report, Final (Tetra Tech EM, Inc.(TtEMI) 1999) present the motivation of screening here for completeness. Section 5.1.2, page 5-5: "The essential human nutrients eliminated as COCs based on EPA guidance are calcium, iron, magnesium, potassium, and sodium (EPA 1989a). Even if these chemicals are present at concentrations above naturally occurring levels, they were eliminated as COCs because they are toxic at only very high doses. In fact, toxicity values for these chemicals have not been developed." Section 5.2.3, page 5-25: "Chemicals that are essential nutrients for humans, including calcium, iron, magnesium, potassium, and sodium, were removed from consideration as ecological COPCs. Although they are not necessarily essential nutrients for biota, these chemicals are toxic only at very high doses. Toxicity values have not been developed for most of these chemicals." Calcium, magnesium, iron, sodium, and potassium are essential human nutrients that are found naturally in soil and water. Per EPA guidance (EPA 1989 - RAGS part A) these chemicals can be eliminated from the human health risk assessment based on their essential nutrient status. These chemicals may be found in higher concentrations in saline or brackish water as a result of naturally occurring salts. The amount of these nutrients needed varies by age, gender, and weight, but concentrations would have to be exceedingly high for a long period of time in order to pose a health threat; at high concentrations, the water would be unpalatable. As discussed in the RI Report, groundwater beneath Site 1, particularly from the FWBZ, is not considered to be a potential source of future drinking water. As a result, the HHRA did not evaluate potential exposure to groundwater through ingestion.

REF	COMMENT	RESPONSE
		With no exposure to groundwater, the concentrations of calcium, magnesium, iron, sodium, and potassium present no threat to human health. In order to determine whether any of the five compounds eliminated as essential nutrients are present in Site 1 soil at toxic levels, the potential intake of these compounds was compared to recommended, average, or minimal required daily intakes (referred to as "reference intakes" [RI]) for these compounds. Potential intakes were calculated for the recreational receptor (average intakes for this receptor are greater than for the occupational receptor) through incidental ingestion of soil. Intakes of the five compounds through inhalation and direct contact will be minimal compared to intake through incidental ingestion. Potential intakes were calculated as follows: (1) average daily intakes (ADI) were calculated using the exposure parameters and algorithms for recreational exposure: soil ingestion (Table C.5.4-1 of the OU-3 Remedial Investigation Report) and (2) ADIs (in units of mg/kg-day) were converted to total daily intakes (TDI) by multiplying by the receptor-specific body weight (kg) to generate TDI estimates in units of mg/day. TDIs were compared to compound-specific RIs. Compound-specific RIs were identified as follows: Calcium: 500 mg/day (dietary reference intake [DRI] for children 1 to 3 years of age – DRIs for older children and adults are higher [less conservative]) (Food and Nutrition Board, Institute of Medicine – National Academy of Sciences [1998]) Sodium: 500 mg/day (USDA and Salt Institute identify this level as a minimal consumption level) Potassium: 120 mg/day (minimum daily requirement for an infant) Magnesium: 80 mg/day (dietary reference intake [DRI] for children 1 to 3 years of age – DRIs for older children and adults are higher [less conservative]) (Food and Nutrition Board, Institute of Medicine – National Academy of Sciences [1998]) Iron: 7 mg/day (recommended daily allowance [RDA] for children 1 to 3 years of age) (*Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Moybdenum, Nickel,*

REF	COMMENT	RESPONSE

Silicon, Vanadium, and Zinc (National Academy Press 2001)

Compounds were judged to not contribute significantly to the daily intake of the essential nutrients if site-specific intakes (TDI) through incidental ingestion of soil contributed less than 10 percent of the RI. The compound-specific TDI was less than 10 percent for all five essential nutrients. In fact, with the exception of iron (7 percent), the TDI represented less than 1 percent of the RI for the other four essential nutrients. These results indicate that the five essential nutrients are not present in Site 1 soil at toxic concentrations. Therefore, their elimination as essential nutrients, consistent with EPA's RAGS guidance, is appropriate.

Also, very high concentrations corresponding to potentially very high doses were not reported for any of the essential human nutrients eliminated as Chemicals of Concern (COC). The historical maximum detected concentrations of essential nutrients at OU-3 are tabulated below.

Chemical	Point Name	Date	Concentration (mg/L)
Calcium	M002-E	10-29-97	388
Iron	M028-A	10-11-91	37.5
Magnesium	HP1-5-D	08-09-94	831
Potassium	M025A	10-06-94	364
Sodium	M025A	10-06-94	6,180

As described in the OU-3 RI, Section 5.2.3, pages 5-25 and 5-26, no chemicals were removed from Chemicals of Potential Concern (COPC) consideration as a result of a detection frequency of less than 5 percent in the ecological risk assessment. However, cyanide was detected above the ecological reference value (ERV)-based screening level (10 micrograms per liter [µg/L]) at Monitoring Well (MW) M001-E during quarterly sampling between June 17, 1991, and March 27, 1992. Groundwater samples collected from M001-E on September 9, 1991, and March 27, 1992 exceeded the screening level (12 and 12.8 µg/L, respectively). Cyanide was not detected above the MRL in groundwater samples collected during the alternating quarters (MRL equal to 10 and 5 µg/L, respectively). This well was not resampled during the OU-3 data gap sampling investigation. All existing wells at OU-3 will be considered for inclusion in the forthcoming groundwater long-

REF	COMMENT	RESPONSE
		term monitoring (LTM) program. Similar text has been added to Section 2.1.3 of the Final OU-3 RI Report Addendum, Volume I. The following discussion regarding frequency of detection screening for the human health risk assessment (HHRA) COCs was presented in the OU-3 RI, Section 5.1.2, Pages 5-5 and 5-6 and is included here for completeness: "A frequency of detection criterion was used because chemicals detected infrequently may be sampling and analytical artifacts or may be associated with spurious data (EPA 1989a). Such chemicals can be eliminated as COCs if there is no reason to believe that the chemicals may be present as a result of site-related activities. A detection frequency limit of 5 percent is conventionally used as a benchmark for elimination. This criterion required evaluating the chemicals based on historical site use, concentration, toxicity, mobility, persistence, and bioaccumulation. Therefore, any chemical considered for elimination using this criterion was also screened against one-tenth of its EPA Region 9 PRG (EPA 1998a) to determine whether it would potentially pose a risk to human health. Chemicals were eliminated as COCs only if they were detected at a low frequency and their maximum concentration was below the EPA Region 9 PRG for residential land use. In general, concentrations of chemicals eliminated using the frequency of detection criterion were far below one-tenth of the PRGs; usually they were one-hundredth to one-thousandth of the PRGs. The cumulative risks and HIs associated with eliminated chemicals were also generally below one-tenth of the PRGs. No effect on the HHRA results would have been observed had these chemicals been retained as COCs." Furthermore, as suggested in the example included in EPA's comment, the fact that all chemicals eliminated as described above were detected both infrequently and at low concentrations, supports the conclusion that these chemical detections represent neither hot spots nor potential release areas.
SPECIFIC COMMENTS		
1	The Navy indicates that it believes that any documents for which it does not receive comments have been approved by the regulators. The Navy should not assume implied approval of any documents submitted to the U.S. EPA based strictly on the non-receipt of comments to a document. (Please refer to response to EPA specific comment #1 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000)	EPA's Comment is noted. The Navy submitted draft and draft final sampling and analysis documents to the regulatory agencies according to the agreed-upon schedules. A decision was made by the Navy to initiate field activities prior to formal acceptance of the final sampling and analysis plan and quality assurance project plan to avoid project delays that would also delay decision-

REF	COMMENT	RESPONSE
		making for OU-3. The final sampling and analysis plans were issued on February 17, 2000. It is important to note that EPA Region IX did comment on the draft documents and that these comments were incorporated into the draft final document. Based on these actions, the Navy assumed that the regulatory agencies had no further comments on the draft final documents. In the future, the Navy will not assume that failure to comment corresponds to regulatory approval.
2	The Navy's response to this (Please refer to response to EPA specific comment #4 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000) is conditionally acceptable. If cyanide later is found to be a COPC, then the Navy should include all data on wells with cyanide detections before completing the FS. For example, at the West Beach Landfill, cyanide is detected in monitoring wells MW-22A and MW-23A, which are adjacent wells located between the Bay and the landfill. It would be inappropriate to screen out cyanide as a COPC at the West Beach Landfill.	See the response to General Comment 1.
3	The response indicates that the requested data was added to the Table. However, the requested addition of "soil gas data" to Table 1-1, Data Gap Number 2, Groundwater Extent of Contamination, was not added. Please make the requested addition. (Please refer to response to EPA specific comment #5 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000)	Table 1-1 has been updated to reflect "soil gas data."
4	The Navy has deferred responding to this comment to the Revised Draft Feasibility Study, which is conditionally acceptable. U.S. EPA reserves the right to re-evaluate this response based on a review of the Revised Draft Feasibility Study (FS) Report. (Please refer to response to EPA specific comment #10 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000)	U.S. EPA reservation of right understood and accepted.
5	The Navy has deferred responding to this comment until after the installation of a long-term landfill gas monitoring system at the landfill, which is conditionally acceptable. U.S. EPA reserves the right to re-evaluate this response based on review of the long-term monitoring results. (Please refer to response to EPA specific comment #11 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000)	U.S. EPA reservation of right understood and accepted.
6	While Figure 1-3 has been modified to show the soil gas sampling locations, the figure does not indicate where the different type of soil gas samples (ie. flux chamber summa canisters/fixed lab, syringe/mobile lab, and summa canister/fixed lab) were collected. Figure 2-6 does identify the flux chamber locations, however, as previously requested, a single figure should identify where and what type of sample(s) were collected at each location. (Please refer to response to EPA specific comment #13 in Draft Final RI Addendum Report, Vol. 1 dated December 12,	Figure 1-3 has been modified to independently designate soil gas locations and colocated soil gas-surface flux locations. To provide clear presentation in the figure, sample collection vessel and analytical protocol has not been indicated on the figure because the number of symbols required in close proximity to one another would result in a very confusing figure. However, additional text has been added to the figure legend to clarify which type of sample collection vessel and laboratory were used for the different sample types.

REF	COMMENT	RESPONSE
	2000)	
7	The Navy's response to this comment (Please refer to response to EPA specific comment #24 in Draft Final RI Addendum Report, Vol. 1 dated December 12, 2000) is not acceptable. No details or procedures for the field or fixed laboratory sample handling procedures were included in the revised report. In addition, though the report indicates that the FSP protocol was followed, there is no statement as to whether there were any deviations from the protocol at any time. Please revise the report to include sample handling procedures and whether the FSP protocol was deviated from, and if so, an explanation of the deviation(s).	A field notebook containing data forms and chain-of-custody documentation was reviewed following the investigation. No deviation from the Field Sampling Plan (FSP) was noted and maximum holding times were not exceeded for any samples collected during the investigation. Refer to Section 2.2.1 of the Draft Final RI Report Addendum, Volume I for sample collection and analytical procedures employed during the investigation. Appendix C, Soil Gas Investigation Report (Interphase Environmental, Inc. 1999), indicates . . . "the standard operating procedure of the mobile laboratory was substantially modified in order to accomplish the extended analytical requirement of this project." This modification included the use of two gas chromatographs to extend the target analyte list and provide lower reporting limits. This was necessary to more closely parallel the surface flux measurements analyzed in the fixed laboratory and allow comparison of results between the two studies. The combined use of a flame ionization detector (FID) and a thermal conductivity detector enabled the laboratory to lower the reporting limit to 0.001 percent (10 parts per million volume). In addition, EPA Method 8015 is commonly used for the analysis of ketones. The mobile laboratory for the landfill gas study at OU-3 detected and measured ketones using a photoionization detector and confirmed by the FID, which constitutes a combination of EPA Method 8020 and 8015. Although the mobile laboratory standard operating procedure was modified, this does not constitute a deviation from the FSP, because analytical methods and accepted practice were adhered to.
8	Section 2.1.1, Page 2-2: The third paragraph on this page discusses the detection of naphthalene and phenanthrene at Sampling Location HP-S01-B3. Acenaphthene was also indicated at this location at 160 micrograms per liter (µg/L). This concentration is only 10 µg/L below the Ecological Reference Value (ERV) of 170 µg/L. It would appear that based upon the precision and accuracy of the laboratory reporting that this compound is close enough to the ERV that it should be included in the discussion of shoreline sampling. Please include a discussion of the chronic marine Ambient Water Quality Criteria (AWQC) for acenaphthene. In addition, in the fourth paragraph, the discussion on the development of the ERV for naphthalene is confusing. The report indicates that the ERV of 620 µg/L was developed by applying a dilution factor of 10 to the chronic freshwater AWQC of 620 µg/L. The report indicates that this is then the "no observed adverse effect level (NOAEL) concentration. It is unclear whether this is also the ERV concentration.	The development of the ERV-based screening levels has been clarified as requested in the text of the report (Section 2.1). In addition, the distinction between the ERV and the ERV-based screening level has been clarified. Table 2-1 in the Final OU-3 RI Report Addendum, Volume I has been modified to accurately present the ERV-based screening levels for VOCs and Semi-volatile organic compounds (SVOC) at OU-3. The modification to ERV-based screening levels is a result of updated ambient water quality criteria (AWQC) that are based on the latest scientific literature. The revised screening criteria presented in the Final OU-3 RI Report Addendum, Volume I has resulted in the detected concentration of naphthalene at Sampling Location HP-S01-B3 being dropped from the Ecological Risk Assessment. In addition, the detected concentration of xylene at Sampling Location HP-S01-B11

REF	COMMENT	RESPONSE
	Also the remainder of the paragraph and the discussion of screening criterion in the second bullet is confusing. Please revise these paragraphs or add an additional section to clearly explain the methodology the Navy used to determine the ERV, NOAEL, and Lowest Observed Adverse Effects Level (LOAEL) and which number was then used by the Navy to determine the significance of a contaminant.	(groundwater hot-spot delineation) exceeded the updated screening criteria. These were the only significant impacts as a result of updated ERV-based screening levels between the Draft Final OU-3 RI Addendum and the final version. The Navy presented an incorrect ERV of 170 µg/L for acenaphthene in the OU-3 Draft Final RI Report Addendum, Volume I, Table 2-1. The correct ERV (710 µg/L, ERV-based screening level of 7,100 µg/L) was presented and applied in the OU-3 RI, Final, Table 6-31A. The reference for the correct marine AWQC, applied as the appropriate ERV at OU-3, is included below: Buchman, M.F. 1999. NOAA Screening Quick Reference Tables. NOAA HAZMAT Report 99-1. Seattle, WA. Coastal Protection and Restoration Division. National Oceanic and Atmospheric Administration. 12 Pages. September. Therefore, the concentration of 160 µg/L of acenaphthene detected at Hydropunch® Location HP-S01-B3 is below the screening value, and does not pose unacceptable risk to aquatic receptors.
9	Section 2.2., page 2-5: The second paragraph on this page states that the landfill gas characterization was performed by C.E. Schmidt as a subcontractor. However, Appendix C indicates that Interphase Environmental, Inc. performed the landfill gas survey. Appendix D indicates that C.E. Schmidt performed the surface flux measurements. Please clearly indicate who performed the various services for the landfill gas characterization.	The Navy employed Dr. C.E. Schmidt as a subcontractor to perform landfill gas and surface flux measurements in their entirety. Dr. Schmidt retained Interphase Environmental, Inc., to perform the landfill gas survey, with his personal oversight. Dr. Schmidt was responsible for the completion, quality assurance, sample handling, and presentation of analytical results for the comprehensive landfill gas and surface flux investigation. The text of the Final OU-3 RI Report Addendum, Volume I has been revised to reflect this relationship.
10	Section 2.2.2.1, Page 2-7: The third paragraph in this section indicates the possibility of methane, "collects in pockets." However, in the first paragraph of Section 2.2.2.2, Volatile Organic Compounds, the report states that the results of VOC detection indicate, "widespread mixing of waste." It would be logical to assume that if methane collected in pockets, that the VOC gasses, since the VOCs are spread out over the landfill, would also tend to collect in the same pockets. Please explain why the VOC gasses would not collect in the same pockets as the methane gases.	Further review indicates that elevated VOC concentrations correspond in four of the six locations where methane was detected at unacceptable levels. Also, as a general trend, VOCs and methane concentrations seem to be elevated at most of the same locations. Furthermore, compared to the average range of VOC and methane concentrations detected in landfill gas across the site, uncharacteristically high concentrations of methane (29 percent by volume) and VOC (vinyl chloride at 580 milligrams per liter [mg/L]) were present at the same location (SG-S01-B9). This comparison corroborates that significant variation may occur in permeability of overlying soil at the site. Localized areas of methane detected in the landfill gas may also indicate that there are areas of the landfill where methane generation is still occurring.

REF	COMMENT	RESPONSE
		Please note that this comment refers to Section 2.2.1.1 (Page 2-7) and Section 2.2.1.2.
11	Figure 1-1, Installation Restoration Site Location Map: Please revise the figure to show all IR Sites, including new IR Site 29 ("Skeet Range"), offshore to OU3. Also, IR Site 2 (OU4A) boundary needs to be expanded to include the WestBeach Wetlands and coastal margins.	Figure 1-1 in the Final OU-3 RI Report Addendum, Volume I has been revised as requested.
Department of Toxic Substances Control Comments from Mary Rose Casa, R.C., Engineering Geologist, Office of Military Facilities, on the Alameda Point Draft Final OU-3 RI Addendum Report, Volume 1, dated January 12, 2001		
1	Please provide extended captions for the aerial photographs in Appendix A (e.g., identify the blue line on Figure A-1 and identify key features (disturbed areas, oiled roads, drums, etc.) on both figures. This may be done on a separate page of text within the appendix.	A separate page of text describing key features for each of the aerial photographs in Appendix A has been included in the Final OU-3 RI Report Addendum, Volume I.
2	Please identify on Figure 1-2 the approximate location (or possible locations) of the trench in which radioactive material was disposed in the late 1950s-early 1960s ("an unlined trench 50 feet long, eight feet deep, and approximately 11 feet wide north of the rifle range, approximately 50 feet north of the aboveground water outlet"[Initial Assessment Study, page 6-44]).	Based on discussions between the Navy and agencies on November 28, 2000, a suspected disposal trench is located near the northwestern portion of OU-3, within the former burn area. The suspected location is indicated in Figure 1-2 of the Final OU-3 RI Report Addendum, Volume I.
3	Please show groundwater elevations along with historic concentrations of COCs at MW M028-A (Figure 2-3). This may be done using a small graph with a limited vertical axis below the chemical constituents graph.	Groundwater elevations have been included in Figure 2-3 in the Final OU-3 RI Report Addendum, Volume I, as requested.
4	Please note that comments were provided on behalf of the Restoration Advisory Board by "Technical Services for Communities" not "... Committees."	This error was included in the Response to Comments on the Alameda Point Draft OU-3 RI/FS Addendum table submitted by the Navy with the Draft Final OU-3 RI Addendum. DTSC's comment is noted; no response is required.

FINAL OPERABLE UNIT 3 REMEDIAL INVESTIGATION ADDENDUM VOLUME II CUMULATIVE HUMAN HEALTH RISK ASSESSMENT

THE ABOVE IDENTIFIED VOLUME IS NOT AVAILABLE.

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FINAL OPERABLE UNIT 3 REMEDIAL INVESTIGATION ADDENDUM VOLUME III GEOTECHNICAL INVESTIGATION AND UNEXPLODED ORDNANCE CHARACTERIZATION AND REMOVAL REPORT

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FINAL OPERABLE UNIT 3
REMEDIAL INVESTIGATION REPORT

DATED 13 DECEMBER 2000

THIS RECORD CONTAINS MULTIPLE VOLUMES
WHICH HAVE BEEN ENTERED SEPARATELY

VOLUME I OF III IS FILED AS ADMINISTRATIVE
RECORD NO. **N00236.001654**

VOLUME II OF III IS FILED AS ADMINISTRATIVE
RECORD NO. **N00236.001655**

VOLUME III OF III IS FILED AS ADMINISTRATIVE
RECORD NO. **N00236.001656**

CONTENTS

Appendix

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

% v/v	Percent by volume
DCE	Dichloroethene
2,4-DMP	2,4-dimethylphenol
APHA	American Public Health Association
ASTM	American Society for Testing and Materials
AWQC	Ambient water quality criteria
bgs	Below ground surface
C	Cohesion intercept
CLP	Contract Laboratory Program
CN	Cyanide
COC	Chemical of concern
Cr^{+3}	Chromium III
Cr^{+6}	Chromium VI
D	duplicate
DQO	Data quality objective
EPA	U.S. Environmental Protection Agency
ERA	Ecological risk assessment
ERV	Ecological reference value
Fe^{+2}	Ferrous iron
FS	Feasibility Study
FWBZ	First water-bearing zone
GP	Geoprobe
HHRA	Human health risk assessment
HI	Hazard index
HP	Hydropunch®
ID	Identification
IR	Installation Restoration
lb/ft^2	Pounds per square foot
lb/ft^3	Pounds per cubic foot
LEL	Lower explosive limit
LFG	Landfill gas
LOAEL	Lowest observed adverse effects level
m^2	Square meters
m^3/min	Cubic meters per minute
m^3/yr	Cubic meters per year
MRL	Method reporting limit
MEK	Methyl ethyl ketone
µg/L	Micrograms per liter
$\mu g/m^3$	Micrograms per cubic meter
$\mu g/m^2$-min	Micrograms per square meter per minute
mg/L	Milligrams per liter
MIBK	Methyl isobutyl ketone
MW	Monitoring well

ACRONYMS AND ABBREVIATIONS (Continued)

NA	Not applicable
NAPL	Nonaqueous-phase liquid
NAS	Naval Air Station
Navy	Department of the Navy
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No observed adverse effects level
NTU	Nephelometric turbidity units
NV	No value
OU	Operable Unit
ppbv	Parts per billion by volume
PRG	Preliminary remediation goal
QAPP	Quality assurance project plan
QC	Quality control
Region IX	EPA Region IX
RA	Remedial alternative
RI	Remedial investigation
RWQCB	Regional Water Quality Control Board
SG	Soil gas
SM	Silty sand
SP	Poorly graded sand
SQL	Sample quantitation limit
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TSS	Total suspended solids
TtEMI	Tetra Tech EM Inc.
UXO	Unexploded Ordnance
VOC	Volatile organic compound

1.0 INTRODUCTION

Tetra Tech EM Inc. (TtEMI) prepared this addendum to the Operable Unit 3 (OU-3) Remedial Investigation (RI) Report (Addendum) for sampling under contract N62474-94-D-7609, Contract Task Order 168. This addendum to the RI Report presents the results of data gap sampling at OU-3, Alameda Point (formerly Naval Air Station [NAS] Alameda), Alameda, California. Data gap sampling was performed in accordance with the Field Sampling Plan for the Data Gap Investigation at OU-3 (Tetra Tech EM Inc. [TtEMI] 2000a) and the corresponding Quality Assurance Project Plan (QAPP) for Data Gap Sampling at OU-3 (TtEMI 2000b). The OU-3 data gap investigation activities presented in this Addendum were performed December 7 through 14, 1999. A follow-up groundwater sampling event was performed May 2 through 4, 2000. A brief review of the data gap sampling plan is provided in Section 1.2; however, the above-referenced documents should be consulted for further details. Site characteristics (including site description, geology, hydrogeology, and past investigations) were provided in the Final OU-3 RI Report issued on August 9, 1999 (TtEMI 1999).

The Navy initially submitted information contained in this RI Addendum in the Draft RI/FS Addendum (TtEMI 2000c) and the Draft Final OU-3 RI Addendum (TtEMI 2000d). The Navy and regulatory agencies decided to separate discussion of data and sampling results as they affect the RI Report and the FS. Therefore, a Draft Final and Final RI/FS Addendum was not submitted, and the report was finalized as the RI Report Addendum.

Comments received on the Draft Final RI Addendum relevant to the RI have been incorporated into this Final RI Addendum Report. Comments received on the Draft Final RI Addendum relevant to the FS will be incorporated into a Revised Draft FS Report to be issued in 2001. Agreement between the Navy and agencies will result in submittal of the OU-3 RI Addendum in three parts: (1) RI Addendum Volume I - Data Gap Summary Report (included herein), (2) RI Addendum Volume II – Risk Assessment and Radiological Closure Report, and (3) RI Addendum Volume III – Geotechnical Investigation and Unexploded Ordnance (UXO) Characterization and Removal Report. This agreement is the result of the Navy's ongoing investigation, removal, and risk assessment regarding radiological anomalies, UXO screening and removal, and geotechnical investigation within OU-3.

The RI Addendum Volume II, the Risk Assessment and Radiological Closure Report, will include the revised Radiological Human Health Risk Assessment (HHRA) and corresponding response to comments. These documents will be finalized following removal of radiological anomalies above about 10,000

counts per minute above background, previously identified at the site. In addition, the final version of Volume II will present comprehensive human health and ecological risk assessment (ERA) results for chemical and radiological items remaining at the site. This risk assessment will provide a summation of potential future carcinogenic risks and health effects other than cancer to allow complete evaluation of potential risks to human and ecological receptors.

The RI Addendum Volume III, the Geotechnical Characterization and UXO Characterization and Removal Report, will present results of the Navy's additional UXO investigation and removal at OU-3. The geotechnical characterization will be performed to provide information required to complete the detailed design of the remedial system recommended in the FS Report. To provide protection against future exposure to UXO at the site, the Navy has secured a contractor to perform surface screening for, and removal of, UXO on the existing ground surface.

1.1 SITE BACKGROUND

OU-3, which consists of Installation Restoration Site 1, is located in the northwestern corner of Alameda Point (see Figure 1-1), and was operated between 1943 and 1956 as NAS Alameda's waste disposal site. The landfill reportedly received all waste generated at NAS Alameda, except liquid waste, which was discharged directly to the Seaplane Lagoon (Ecology and Environment, Inc. 1983). Figure 1-2 represents the current configuration of OU-3. The OU-3 boundary was revised to include the area encompassing all anomalies detected during a radiological survey. The revised OU-3 boundary was cooperatively developed by representatives of the Navy, regulatory agencies, and TtEMI (TtEMI 1999).

Limited information is available regarding construction of the OU-3 landfill. A rock seawall, originally a jetty protecting the harbor entrance, lies at the northern perimeter of the landfill and was in place before 1915. A 1942 geodetic survey chart for NAS Alameda shows water as deep as 20 feet at what is now the western shoreline (U.S. Coast Guard 1942). Construction history obtained from Alameda Point, archived drawings, and aerial photographs show that sunken barges and pontoons were placed along the western side of the site, adjacent to the bay (Pacific Aerial Surveys 1949, 1957) (see Appendix A). Natural sedimentation of clayey and silty material likely accumulated along the barges, which were placed as a structure for deposits of hydraulic fill. The OU-3 disposal area was originally filled with dredge spoils during the early 1940s, beginning with the northern part of the landfill next to the jetty. According to a screening questionnaire completed by the Navy on June 21, 1988, the landfill has no liner. The

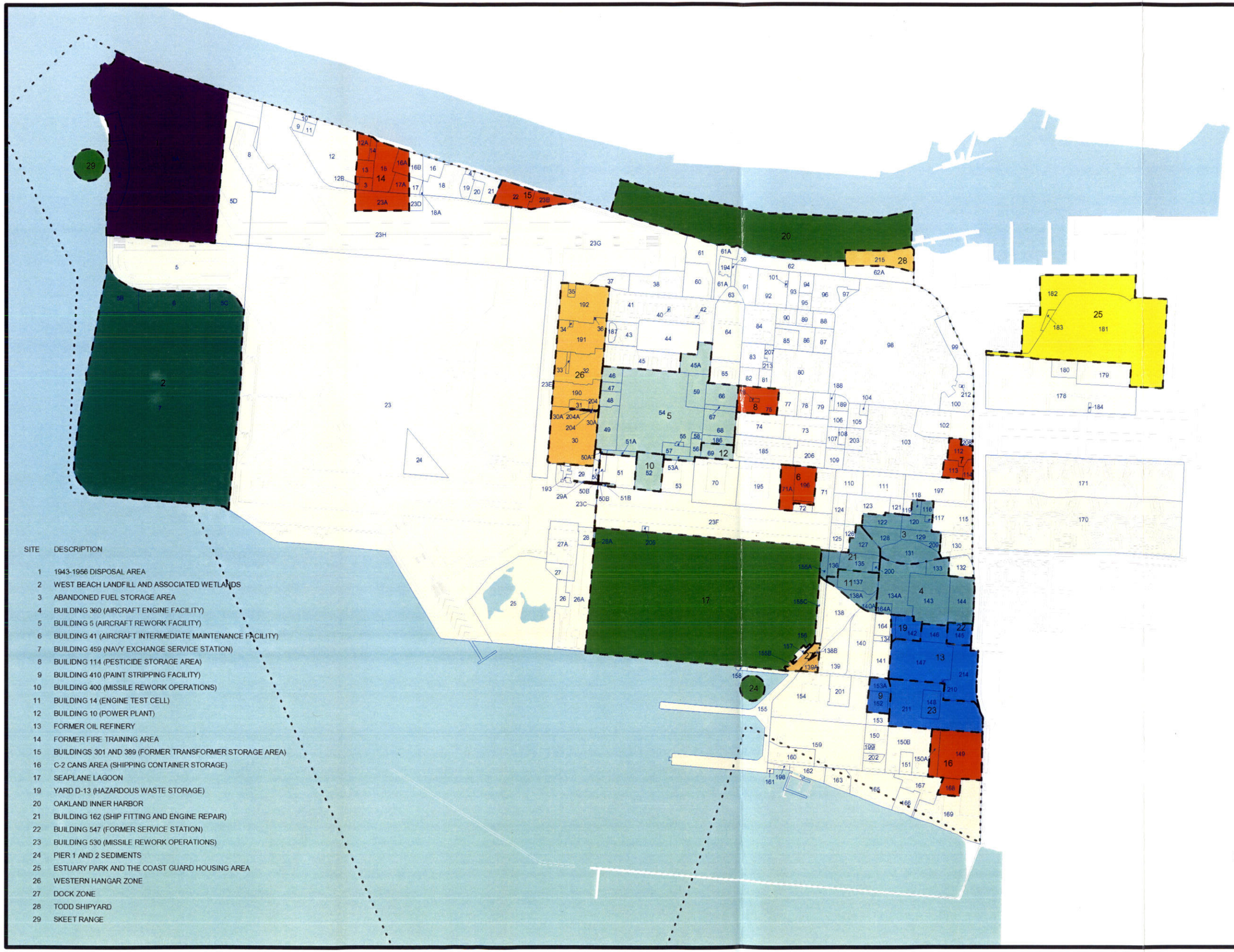
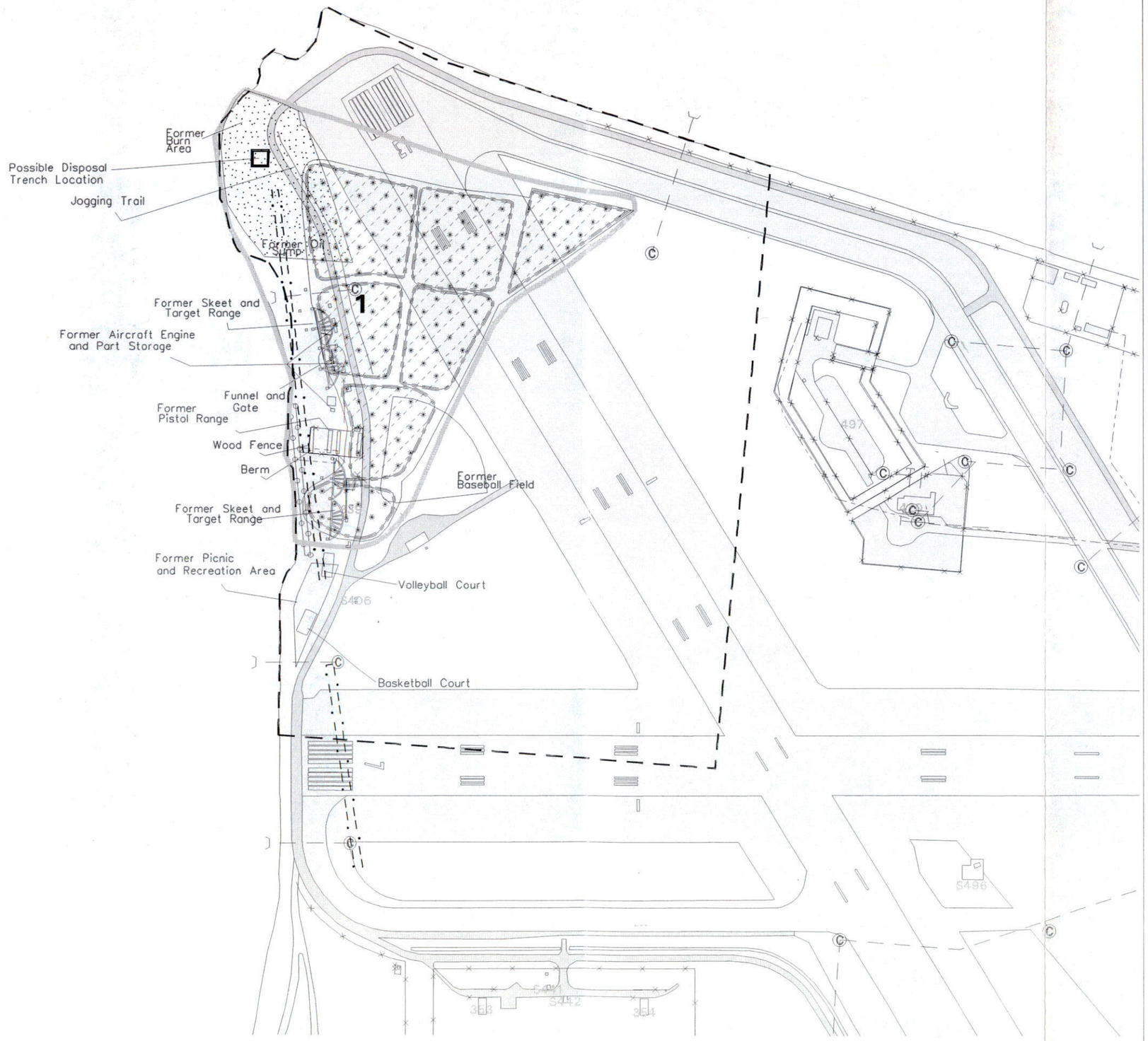


FIGURE 1-1

OPERABLE UNITS AND INSTALLATION RESTORATION SITES

ALAMEDA POINT
ALAMEDA, CALIFORNIA
JANUARY 25, 2001

C:\GEORGIES\MISC\IRSITES_LASER.APR 11_17 LAYOUT



LEGEND

- STORM DRAIN CATCH BASIN
- IR SITE BOUNDARY (OUTSIDE BOUNDARY)
- FENCE
- PAVED ROAD OR PARKING LOT
- BUILDING, CONCRETE, PAVED, OR COVERED AREA
- 1 — WASTE DISPOSAL AREA (INSIDE BOUNDARY)
- 517 — BUILDING AND BUILDING NUMBER
- 1947 DISPOSAL ACTIVITIES
- 1949 DISPOSAL ACTIVITIES
- 1957 DISPOSAL ACTIVITIES
- WASTE DISPOSAL CELL BOUNDARY
- BARGE LINES (1949 AERIAL SURVEY)
- BARGE LINES (1957 AERIAL SURVEY)

NOTE: BARGE LINES ARE INFERRED

150 0 150 300

SCALE: 1" = 300'

FIGURE 1–2
OU–3 PHYSICAL FEATURES
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DS . 0168 . 15877

12/06/00 alameda/ou3ri/actualbnd.map

questionnaire also indicated that the waste and current soil cover depth, methane production capacity, landfill gas characteristics, and exact landfill cell boundaries are unknown.

Under U.S. Environmental Protection Agency (EPA) Guidelines for Groundwater Classification (EPA 1988b), the aquifer at OU-3 is currently designated Class II (groundwater that is a current or potential source of drinking water and water that has other beneficial uses), but is not intended for future use as a drinking water source in this area. Additionally, OU-3 groundwater was not identified as a potential drinking water source in the Determination of the Beneficial Uses of Groundwater at Alameda Point Technical Memorandum (TtEMI 2000e). A golf course and regional park trail that may include irrigation are proposed for site reuse (TtEMI 1999).

An HHRA was conducted for OU-3 groundwater. The HHRA focused on the potential exposure pathway of inhalation of vapors through (1) direct migration from the first water bearing zone (FWBZ) through the vadose zone to ambient air and (2) release to ambient air during irrigation (TtEMI 1999). The total excess lifetime carcinogenic risk and hazard index (HI) posed to occupational or recreational receptors by potential exposure through inhalation of volatile organic compounds (VOC) migrating from the FWBZ to ambient air were less than 10^{-6} and 1, respectively. For the second HHRA potential exposure pathway, a groundwater fate and transport model, MODFLOW, was run during the RI to determine concentrations of four VOCs at a hypothetical irrigation well located upgradient from the landfill. Potential carcinogenic risks for an occupational receptor irrigation scenario were determined to be less than 10^{-6}, and the HI was less than 1.

A screening-level ERA was conducted for OU-3 groundwater to determine potential risks to aquatic organisms (TtEMI 1999), based on discharge of shallow groundwater to waters of San Francisco Bay. During the ERA, a dilution factor of 10 was applied to contaminant concentrations to take into account attenuation and mixing that occur when groundwater discharges to surface water, in accordance with the National Oceanic and Atmospheric Administration (NOAA) practice (Buchman, M.F. 1999). ERA results indicated that concentrations of 2,4-dimethylphenol (2,4-DMP); 2-methylphenol; 1,2-dichloroethene (DCE); toluene; and xylene present in samples from Monitoring Wells (MW) M028-A, M028-E, and M034-A (identified as the groundwater hot-spot) could adversely impact aquatic receptors. An ERA conducted for OU-3 groundwater wells outside of the hot-spot indicated that potential ecological risks would not exceed applicable criteria.

1.2 PURPOSE

The purpose of this investigation was to provide further environmental characterization (data gap sampling) at OU-3 so that the Navy can proceed with the Revised Draft FS Report. Information was required to address the following five specific data gaps identified by the Navy and regulatory agencies during review of the OU-3 RI Report:

1. a. Delineate the eastern boundary of chemicals of concern (COC) in the known groundwater hot-spot (identified in the OU-3 Draft FS Report as a general response area requiring remedial action) to support proper evaluation of remedial alternatives during the FS.

   b. Determine whether groundwater chemical parameters at the hot-spot may interfere with remedial alternatives identified in the Draft OU-3 FS Report and obtain current concentrations of COCs.

2. Determine whether contaminated groundwater is impacting the shoreline in concentrations that would adversely impact aquatic receptors in the San Francisco Bay from areas outside of the identified hot-spot.

3. Determine whether the cyanide concentration in groundwater at MW M025-A could adversely impact aquatic receptors (not resampled since cyanide was detected in 1991).

4. Determine methane and VOC concentrations in soil gas in the seven landfill cells and the former burn area to aid in evaluating potential containment venting options.

5. Determine the thickness of existing soil cover in landfill areas and obtain geotechnical parameters of the existing cover.

Results of the data gap investigation were intended to assist in a complete evaluation of remedial alternatives during the FS process and to ensure that conclusions of the Revised Draft FS Report are comprehensive. A brief description of data gap sampling rationale is outlined as follows. Results are discussed in Section 2.

1.2.1 Data Quality Objectives

Data quality objectives (DQO) were developed using the seven-step process outlined in Guidance for the Data Quality Objective Process (EPA 1994a) to address the five data gaps identified at the site. DQOs are used to develop a scientific and resource-effective design for data collection. DQOs for the OU-3 data gap sampling are presented in Table 1-1.

TABLE 1-1
OPERABLE UNIT 3 DATA QUALITY OBJECTIVES
ALAMEDA POINT,
ALAMEDA, CALIFORNIA
(Page 1 of 3)

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Data Gap 1 A known groundwater hot spot is present at the site; however, the eastern boundary of the hot spot has not been delineated.	What is the general response action area (defined in the OU-3 FS as the area requiring a remedial action) to be addressed by the groundwater remedial action at the known hot spot? Are any chemicals present in groundwater at the hot spot that would interfere with remedial alternatives identified in the Draft OU-3 FS report?	Data from previous investigation including IR data collected between 1991 and 1998 and University of Waterloo data collected in 1996. Geologic and hydrogeologic data. Ecological water quality criteria. Chemicals that could impact groundwater remedial alternatives identified in the Draft OU-3 FS.	Three locations will initially be sampled at about 75 feet east of Monitoring Well M034A, as indicated in Figure 1-3. The study boundary for data gap 1 is one step-out (75 feet out from a sample that exceeds the action level). The depth boundary for all groundwater samples is 20 feet bgs.	If action levels are exceeded at any of the three initial sample locations, then step-out samples will be collected. If the eastern boundary of the groundwater hot spot extends past well M034-A, then the general response action area for the groundwater remedial action in the FS will be expanded. If chemicals are present that could interfere with a remedial alternative, then the remedial alternative will be modified or removed from the FS, as appropriate.	Because the sampling effort for data gap 1 focuses on delineating the boundary of a known area of contamination, rather than a random sampling grid, statistical analysis of existing data is not considered to be necessary. The sample distance of 75 feet was selected for three proposed sampling locations, as well as potential step-outs. This distance was based on previous sample intervals used during the plume investigation, conducted prior to funnel and gate installation. A 75-foot sample interval was also selected because the GRA area for the groundwater hot spot was defined as 100 by 200 feet (see Figure 1-3). Taking three samples with a width of 150 feet would extend beyond the 100-foot width of the GRA area.	For data gap 1, field screening data will be used to assess whether step-out samples should be collected. The field screening method used will measure total chlorinated VOCs, which is more specific to DCE than vinyl chloride (also present at high concentrations).

TABLE 1-1
OPERABLE UNIT 3 DATA QUALITY OBJECTIVES
ALAMEDA POINT,
ALAMEDA, CALIFORNIA
(Page 2 of 3)

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Data Gap 2 Groundwater samples need to be collected from additional shoreline locations to evaluate whether chemicals outside of the known hot spot could adversely impact aquatic receptors.	Are there any other groundwater areas containing COCs at levels that could reach the bay and harm aquatic receptors? If so, are groundwater remedial actions required?	Data from previous investigation including IR data collected between 1991 and 1998. Geologic and hydrogeologic data. Landfill disposal cell locations. Ecological water quality criteria. Soil gas data.	The physical boundary of this investigation is at the shoreline downgradient from the IR Site 1 landfill. Groundwater sampling locations are shown in Figure 1-3. The depth boundary for all groundwater samples is 20 feet bgs.	If groundwater at the nine additional shoreline locations contains chemicals exceeding 10 times the ecological screening criteria, then risks to aquatic receptors may exist. The FS will be expanded to address additional groundwater areas, if required.	Data gap 2 sample results will be used to evaluate effects of groundwater COCs towards aquatic receptors. Therefore, statistical analysis of existing data is not considered to be necessary. A meeting was held on July 28, 1999, between the Navy and regulatory agencies. Sampling locations for data gap 2 were agreed upon at this meeting (see Figure 1-3). Sampling intervals were located to ensure that groundwater samples at no more than about 250 feet apart will be analyzed for COCs along the shoreline.	In the case of data gap 2, the investigation has been optimized based on known data.
Data Gap 3 Cyanide was detected at levels that could pose an unacceptable risk to aquatic receptors in Monitoring Well M025A in 1991; this well has not been resampled for cyanide analysis since that time.	Is cyanide present in Monitoring Well M025-A at levels that could pose a risk to aquatic receptors? If so, is a groundwater remedial action required?	Data from the 1991 IR investigation. Ecological water quality criteria. Geologic and hydrogeologic data.	The study boundary for this data gap is Monitoring Well M025A.	If a groundwater sample collected from well M025A contains cyanide exceeding 10 times the ecological screening criteria, then risks to aquatic receptors may exist. Additional samples will be taken, as required, and the FS will be expanded, if required.	Because only one well will be sampled, there will be no error limits for data gap 3. Therefore, statistical analysis of existing data is not considered to be necessary.	Based on results from the sample collected for data gap 3, a future study may occur. Sampling locations would be optimized based on levels detected in the well.

TABLE 1-1
OPERABLE UNIT 3 DATA QUALITY OBJECTIVES
ALAMEDA POINT,
ALAMEDA, CALIFORNIA
(Page 3 of 3)

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Data Gap 4 The presence of LFG has not been assessed at the landfill. Elevated levels of LFG can pose a risk to human health and the environment.	Is LFG present at levels that would require monitoring or collection and treatment after a landfill cap is installed?	ARARs for LFG. Human health risk assessment. Landfill gas collection system design.	For this investigation, the physical boundaries of the study include the landfill boundaries. LFG sample locations are shown in Figure 1-3. Thirty-one shallow vapor sample locations were selected to assess LFG levels in the landfill.	For six disposal cells and the burn area, about four shallow vapor samples will be collected. If VOCs are detected in any subsurface samples in a given area, then surface samples will be collected from up to two locations: (a) the surface of the sample containing maximum VOC concentrations, and (b) the surface of the sample containing median VOC concentrations. If VOCs are detected at levels harmful to human health, then LFG will be addressed in the OU-3 FS.	About four LFG samples will be collected from each disposal cell, which is considered adequate for assessing LFG levels. Statistical analysis of existing data and proposed LFG sample locations is considered unnecessary. Shallow vapor sample locations were selected at up to five groundwater sample locations. This will aid in determining a relationship between groundwater and vapor COCs.	This LFG survey should provide all necessary information to determine the need for LFG controls and monitoring for landfill capping.
Data Gap 5 The depth of soil covering landfill refuse has not been assessed.	What are the geotechnical characteristics and thickness of soil covering landfill refuse?	Landfill cap design. Geotechnical data.	The physical boundaries of the study include the landfill boundaries. Soil samples will be collected at each LFG sample location shown in Figure 1-3. About 15 samples will be analyzed for geotechnical parameters.	If soil cover thickness is adequate for use as a foundation layer, then additional foundation soil will not be required for the landfill cap. If geotechnical characteristics of the soil at the landfill are adequate, then additional soil could be consolidated beneath the landfill cap.	A geotechnical engineer indicated that geotechnical analysis of about two soil samples per landfill cell would be adequate for landfill cap design. Statistical analysis of existing geotechnical data and proposed additional geotechnical sample locations is not considered to be necessary.	This soil cover study should provide all necessary information to design the landfill cap.

Notes

ARAR Applicable or relevant and appropriate requirement
COC Chemical of concern
DCE Dichloroethene
EPA U.S. Environmental Protection Agency
FS Feasibility Study
FSP Field sampling plan
GRA General response action
IR Installation Restoration
LFG Landfill gas
OU Operable unit
VOC Volatile organic compound

The required samples to address the five data gaps consisted of a combination of (1) direct push and MW groundwater samples, (2) subsurface gas samples and surface flux landfill gas samples, and (3) shallow soil samples. Samples collected during the data gap investigation and analyses performed are listed in Tables 1-2a through 1-2c. The appropriate quantity and quality of samples necessary to generate the data required to meet DQOs was determined and presented in the QAPP (TtEMI 2000b).

1.2.2 Groundwater

Groundwater quality was characterized in four specific areas during the data gap investigation. The intent of these samples was to: (1) assess groundwater that may contact surface waters at the western and northwestern shoreline, (2) determine whether compounds were present in the area of the groundwater hot-spot that would influence a remedial technology decision during the FS process, (3) determine whether cyanide is present at monitoring well M025-A in concentrations that may pose a risk to aquatic receptors, and (4) determine whether the boundary of the hot-spot needs to be extended toward the east. Groundwater sampling locations are illustrated in Figure 1-3.

Groundwater Shoreline

Groundwater samples were collected from nine new sampling locations (HP-S01-B1 through HP-S01-B9) around the perimeter of the landfill area to support the ERA conclusions in the RI, which were based on data from existing monitoring wells. Perimeter samples were collected near the western and northwestern shorelines of the site. To provide data to represent the heterogeneous hydrogeology at the site, sampling locations were not farther than 250 feet apart. The new sampling locations are illustrated in Figure 1-3.

Groundwater Hot-Spot - Eastern Boundary

The groundwater hot-spot was identified in the OU-3 RI Report as an area requiring remediation. It consists of an area of about 200 by 100 feet near the western shoreline, where elevated concentrations of COCs have been detected and are potentially impacting surface water of the San Francisco Bay.

Groundwater data previously collected at the site was insufficient to determine whether COCs were present to the east of the identified hot-spot boundary developed in the RI Report. Groundwater samples were collected at three locations (HP-S01-B10 through HP-S01-B12) 75 feet east of, and parallel to, the apparent eastern boundary of the hot-spot to aid in characterization. Borings were advanced using direct-

LEGEND

- MONITORING WELL LOCATION
- HYDROPUNCH LOCATION
- SOIL VAPOR GAS LOCATION [10 MILLILITER SYRINGE, MOBILE LABORATORY]
- COLOCATED SOIL VAPOR GAS LOCATION [10 MILLILITER SYRINGE, MOBILE LABORATORY] AND SURFACE FLUX LOCATION [6-LITER SUMMA CANISTER, FIXED LABORATORY]
- PAVED ROAD OR PARKING LOT
- BUILDING, CONCRETE, PAVED, OR COVERED AREA
- 517 BUILDING AND BUILDING NUMBER
- IR SITE BOUNDARY
- GROUNDWATER HOT SPOT LOCATION
- GROUNDWATER FLOW DIRECTION

NOTE:

Landfill Gas Confirmatory samples performed at Sample Locations SG-S01-B9, SG-S01-B10, and SG-S01-B15 were collected using 6-liter Summa canisters and analyzed in the fixed laboratory.

N

100' 0 100' 200'

SCALE: 1" = 200'

FIGURE 1-3
OU-3 DATA GAPS SAMPLING LOCATIONS
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DS . 0168 . 15877

DATE: 12/6/00 DN FILE NAME: Q:\ALAMEDA\OU3R\SITE1\DATACAPS\Figure1-3.dwg

TABLE 1-2a

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR GROUNDWATER, LANDFILL GAS, AND QUALITY CONTROL SAMPLES
SITE 1, ALAMEDA POINT
ALAMEDA, CALIFORNIA

Laboratory Identification	Field Identification	Matrix	Field Interface Probe[a]	Field Screening Organohalides	VOC Fixed-Laboratory Analysis	SVOC Fixed-Laboratory Analysis	VOC/Methane		
							Landfill Gas Confirmatory Analysis	Landfill Gas	Flux Chamber Gas
SHORELINE SAMPLES									
122-S01-001	HP-S01-B1-5	Water	--	--	X	--	--	--	--
122-S01-002	HP-S01-B1-15	Water	--	--	X	--	--	--	--
122-S01-003	HP-S01-B2-5	Water	--	--	X	X	--	--	--
122-S01-004	HP-S01-B2-15	Water	--	--	X	X	--	--	--
122-S01-005	HP-S01-B3-5	Water	--	--	X	X	--	--	--
122-S01-006	HP-S01-B3-15	Water	--	--	X	X	--	--	--
122-S01-007	HP-S01-B4-5	Water	--	--	X	X	--	--	--
122-S01-008	HP-S01-B4-15	Water	--	--	X	X	--	--	--
122-S01-009	HP-S01-B5-5	Water	--	--	X	X	--	--	--
122-S01-010	HP-S01-B5-15	Water	--	--	X	X	--	--	--
122-S01-011	HP-S01-B6-5	Water	--	--	X	X	--	--	--
122-S01-012	HP-S01-B6-15	Water	--	--	X	X	--	--	--
122-S01-013	HP-S01-B7-5	Water	--	--	X	X	--	--	--
122-S01-014	HP-S01-B7-15	Water	--	--	X	X	--	--	--
122-S01-015	HP-S01-B8-5	Water	--	--	X	X	--	--	--
122-S01-016	HP-S01-B8-15	Water	--	--	X	X	--	--	--
122-S01-017	HP-S01-B9-5	Water	--	--	X	X	--	--	--
122-S01-018	HP-S01-B9-15	Water	--	--	X	X	--	--	--
122-S01-019	HP-S01-B8-5D[c]	Water	--	--	X	X	--	--	--
122-S01-020	HP-S01-B8-15D	Water	--	--	X	X	--	--	--
122-S01-147	HP-S01-B1-5A	Water	--	--	X	X	--	--	--
122-S01-148	HP-S01-B1-15A	Water	--	--	X	X	--	--	--
SAMPLES EAST OF MONITORING WELL MO34A (HOT SPOT)									
122-S01-021	HP-S01-10-5	Water	X	X	X	X	--	--	--
122-S01-022	HP-S01-10-15	Water	--	X	X	X	--	--	--
122-S01-023	HP-S01-B11-5	Water	X	X	X	X	--	--	--
122-S01-024	HP-S01-B11-15	Water	--	X	X	X	--	--	--
122-S01-025	HP-S01-B12-5	Water	X	X	X	X	--	--	--
122-S01-026	HP-S01-B12-15	Water	--	X	X	X	--	--	--
122-S01-027	HP-S01-B11-15D	Water	X	X	X	X	--	--	--

TABLE 1-2a

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR GROUNDWATER, LANDFILL GAS, AND QUALITY CONTROL SAMPLES
SITE 1, ALAMEDA POINT
ALAMEDA, CALIFORNIA

Laboratory Identification	Field Identification	Matrix	Field Interface Probe[a]	Field Screening Organohalides	VOC Fixed-Laboratory Analysis	SVOC Fixed-Laboratory Analysis	VOC/Methane		
							Landfill Gas Confirmatory Analysis	Landfill Gas	Flux Chamber Gas
LANDFILL GAS SAMPLES									
122-S01-039	SG-S01-B1-0	Landfill gas	--	--	--	--	--	--	X
122-S01-040	SG-S01-B1-3	Landfill gas	--	--	--	--	--	X	--
122-S01-042	SG-S01-B2-3	Landfill gas	--	--	--	--	--	X	--
122-S01-044	SG-S01-B3-3	Landfill gas	--	--	--	--	--	X	--
122-S01-045	SG-S01-B4-0	Landfill gas	--	--	--	--	--	--	X
122-S01-046	SG-S01-B4-3	Landfill gas	--	--	--	--	--	X	--
122-S01-047	SG-S01-B5-0	Landfill gas	--	--	--	--	--	--	X
122-S01-048	SG-S01-B5-3	Landfill gas	--	--	--	--	--	X	--
122-S01-049	SG-S01-B6-0	Landfill gas	--	--	--	--	--	--	X
122-S01-050	SG-S01-B6-3	Landfill gas	--	--	--	--	--	X	--
122-S01-052	SG-S01-B7-3	Landfill gas	--	--	--	--	--	X	--
122-S01-054	SG-S01-B8-3	Landfill gas	--	--	--	--	--	X	--
122-S01-055	SG-S01-B9-0	Landfill gas	--	--	--	--	--	--	X
122-S01-056	SG-S01-B9-3	Landfill gas	--	--	--	--	--	X	--
122-S01-056D[b]	SG-S01-B9-3D	Landfill gas	--	--	--	--	X	--	--
122-S01-058	SG-S01-B10-3	Landfill gas	--	--	--	--	--	X	--
122-S01-058D[b]	SG-S01-B10-3D	Landfill gas	--	--	--	--	X	--	--
122-S01-059	SG-S01-B11-0	Landfill gas	--	--	--	--	--	--	X
122-S01-060	SG-S01-B11-3	Landfill gas	--	--	--	--	--	X	--
122-S01-061	SG-S01-B12-0	Landfill gas	--	--	--	--	--	--	X
122-S01-062	SG-S01-B12-3	Landfill gas	--	--	--	--	--	X	--
122-S01-064	SG-S01-B13-3	Landfill gas	--	--	--	--	--	X	--
122-S01-066	SG-S01-B14-3	Landfill gas	--	--	--	--	--	X	--
122-S01-068	SG-S01-B15-3	Landfill gas	--	--	--	--	--	X	--
122-S01-068D[b]	SG-S01-B15-3D	Landfill gas	--	--	--	--	X	--	--
122-S01-070	SG-S01-B16-3	Landfill gas	--	--	--	--	--	X	--
122-S01-071	SG-S01-B17-0	Landfill gas	--	--	--	--	--	--	X
122-S01-072	SG-S01-B17-3	Landfill gas	--	--	--	--	--	X	--
122-S01-074	SG-S01-B18-3	Landfill gas	--	--	--	--	--	X	--
122-S01-076	SG-S01-B19-3	Landfill gas	--	--	--	--	--	X	--

TABLE 1-2a

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR GROUNDWATER, LANDFILL GAS, AND QUALITY CONTROL SAMPLES
SITE 1, ALAMEDA POINT
ALAMEDA, CALIFORNIA

Laboratory Identification	Field Identification	Matrix	Field Interface Probe[a]	Field Screening Organohalides	VOC Fixed-Laboratory Analysis	SVOC Fixed-Laboratory Analysis	VOC/Methane		
							Landfill Gas Confirmatory Analysis	Landfill Gas	Flux Chamber Gas
122-S01-077	SG-S01-B20-0	Landfill gas	--	--	--	--	--	--	X
122-S01-078	SG-S01-B20-3	Landfill gas	--	--	--	--	--	X	--
122-S01-079	SG-S01-B21-0	Landfill gas	--	--	--	--	--	--	X
122-S01-080	SG-S01-B21-3	Landfill gas	--	--	--	--	--	X	--
122-S01-082	SG-S01-B22-3	Landfill gas	--	--	--	--	--	X	--
122-S01-084	SG-S01-B23-3	Landfill gas	--	--	--	--	--	X	--
122-S01-085	SG-S01-B24-0	Landfill gas	--	--	--	--	--	--	X
122-S01-086	SG-S01-B24-3	Landfill gas	--	--	--	--	--	X	--
122-S01-088	SG-S01-B25-3	Landfill gas	--	--	--	--	--	X	--
122-S01-089	SG-S01-B26-0	Landfill gas	--	--	--	--	--	--	X
122-S01-090	SG-S01-B26-3	Landfill gas	--	--	--	--	--	X	--
122-S01-092	SG-S01-B27-3	Landfill gas	--	--	--	--	--	X	--
122-S01-093	SG-S01-B28-0	Landfill gas	--	--	--	--	--	--	X
122-S01-094	SG-S01-B28-3	Landfill gas	--	--	--	--	--	X	--
122-S01-095	SG-S01-B29-0	Landfill gas	--	--	--	--	--	--	X
122-S01-096	SG-S01-B29-3	Landfill gas	--	--	--	--	--	X	--
122-S01-098	SG-S01-B30-3	Landfill gas	--	--	--	--	--	X	--
122-S01-099A	SG-S01-B31-0	Landfill gas	--	--	--	--	--	--	X
122-S01-099	SG-S01-B31-3	Landfill gas	--	--	--	--	--	X	--
122-S01-100	SG-S01-B9-3D	Landfill gas	--	--	--	--	--	X	--
122-S01-101	SG-S01-B17-3D	Landfill gas	--	--	--	--	--	X	--
122-S01-102	SG-S01-B31-3D	Landfill gas	--	--	--	--	--	X	--
122-S01-103	SG-S01-B9-0D	Landfill gas	--	--	--	--	--	--	X
122-S01-104	SG-S01-B11-0D	Landfill gas	--	--	--	--	--	--	X
122-S01-151	SG-S01-B11-C[d]	Landfill gas	--	--	--	--	--	--	X
SOURCE WATER BLANK									
122-S01-105	*Source Water Blank*	Water	--	--	X	X	--	--	--
EQUIPMENT RINSATES									
122-S01-106	*Equipment Rinsate*	Water	--	--	X	X	--	--	--
122-S01-107	*Equipment Rinsate*	Water	--	--	X	X	--	--	--
TRIP BLANK									

TABLE 1-2a

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR GROUNDWATER, LANDFILL GAS, AND QUALITY CONTROL SAMPLES
SITE 1, ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 4 of 4)

Laboratory Identification	Field Identification	Matrix	Field Interface Probe[a]	Field Screening Organohalides	VOC Fixed-Laboratory Analysis	SVOC Fixed-Laboratory Analysis	VOC/Methane		
							Landfill Gas Confirmatory Analysis	Landfill Gas	Flux Chamber Gas
122-S01-110	*Trip Blank*	Water	--	--	X	--	--	--	--
122-S01-111	*Trip Blank*	Water	--	--	X	--	--	--	--
122-SO1-149	*Trip Blank*	Water	--	--	X	--	--	--	--
FIELD BLANK									
122-S01-112	*Landfill Gas blanks*	Air	--	--	--	--	--	X	--
122-S01-113	*Landfill Gas blanks*	Air	--	--	--	--	--	X	--
122-S01-114	*Landfill Gas blanks*	Air	--	--	--	--	--	X	--
122-S01-115	*Flux Chamber blank*	Air	--	--	--	--	--	--	X
122-S01-116	*Flux Chamber blank*	Air	--	--	--	--	--	--	X
FLUX CHAMBER BACKGROUND SAMPLE									
122-S01-117	*Flux Chamber*	Air	--	--	--	--	--	--	X

Notes:

-- Not applicable
[a] Field interface probe was used to determine air/water interface elevation prior to sample collection.
[b] Samples 122-S01-056D, 122-S01-058D, and 122-S01-068D are field laboratory confirmation samples.
[c] Duplicates will be identified by adding the letter "D" after the field identification number.
[d] Flux chamber control point sample.

HP Hydropunch®
SVOC Semivolatile organic compound
VOC Volatile organic compound
SG Soil gas sample

TABLE 1-2b

FIELD AND LABORATORY IDENTIFICATION NUMBERS FOR GROUNDWATER AND QUALITY CONTROL SAMPLES SITE 1, ALAMEDA POINT ALAMEDA, CALIFORNIA

Laboratory Identification	Field Identification	Matrix	VOC	SVOC	CN	Total Fe^{+2} Hach Method[a]	TSS	Turbidity	Total Sulfide	Total Nitrate	Total Alkalinity	Total Cr^{+6}	Total Cr^{+3}	Oil/Grease
Monitoring Wells														
122-S01-118	M-025A-5	Water	--	--	X	--	--	--	--	--	--	--	--	--
122-S01-119	M-028A-5	Water	X	X	--	X	X	X	X	X	X	X	X	X
122-S01-120	M-025A-5D[b]	Water	--	--	X	--	--	--	--	--	--	--	--	--
122-S01-121	M-028A-5D[b]	Water	X	X	--	X	X	X	X	X	X	X	X	X

Laboratory Identification	Field Identification	Matrix	Dissolved Fe^{+2} Hach Method[a]	Dissolved Sulfide	Dissolved Nitrate	Dissolved Alkalinity	Dissolved Cr^{+6}	Dissolved Cr^{+3}
Monitoring Wells								
122-S01-118	M-025A-5	Water	--	--	--	--	--	--
122-S01-119	M-028A-5	Water	X	X	X	X	X	X
122-S01-120	M-025A-5D[b]	Water	--	--	--	--	--	--
122-S01-121	M-028A-5D[b]	Water	X	X	X	X	X	X

Notes:

[a] Ferrous iron by Hach field kit method to be performed by the field sampling team.
[b] Duplicates will be identified by adding the letter D after the field identification number.
CN Cyanide
Cr^{+3} Trivalent chromium
Cr^{+6} Hexavalent chromium
SVOC Semivolatile organic compound
TSS Total suspended solids
VOC Volatile organic compound
Fe^{+2} Ferrous iron
D Duplicate

TABLE 1-2c

FIELD AND LABORATORY IDENTIFICATION NUMBERS
FOR SOIL AND QUALITY CONTROL SAMPLES
SITE 1, ALAMEDA POINT
ALAMEDA, CALIFORNIA

Laboratory Identification	Field Identification	Matrix	Depth Feet (bgs)	Grain Size	Load-bearing Capacity[b]
122-S01-124	GP-S01-B9	Soil	0 to 4	X	X
122-S01-125	GP-S01-B10	Soil	0 to 4	X	X
122-S01-126	GP-S01-B12	Soil	0 to 4	X	X
122-S01-128	GP-S01-B16	Soil	0 to 4	X	X
122-S01-129	GP-S01-B18	Soil	0 to 4	X	X
122-S01-130	GP-S01-B19	Soil	0 to 4	X	X
122-S01-132	GP-S01-B23	Soil	0 to 4	X	X
122-S01-133	GP-S01-B25	Soil	0 to 4	X	X
122-S01-134	GP-S01-B28	Soil	0 to 4	X	X
122-S01-135	GP-S01-B9D[a]	Soil	0 to 4	X	X
122-S01-136	GP-S01-B28D	Soil	0 to 4	X	X
122-S01-138	GP-S01-B28D2	Soil	0 to 4	X	X

Note:
[a] Duplicates will be identified by adding the letter "D" after the field identification number.
[b] Load-bearing capacity was determined using American Society for Testing and Materials (ASTM) Method D-3080.
bgs Below ground surface
GP Geoprobe sample

push technology, and disposable bailers were used to collect "grab" groundwater samples at depths of about 5 and 15 feet below ground surface (bgs). Organohalide concentrations above 5,900 micrograms per liter (µg/L) indicated the potential presence of 1,2-DCE above the ecological reference value (ERV) based screening level, as established in the QAPP (TtEMI 2000b). This value was used as the decision rule for step-out sample collection, based on the potential presence of 1,2-DCE. Samples collected from the original three locations were screened for organohalide concentrations using the Quick Test® Volatile Organic Halides Water Test Kit. "Organohalide" is a compound classification that includes 1,2-DCE. The field screening results indicated that step-out sampling was not required. The sampling locations are illustrated in Figure 1-3.

Groundwater Verification - M025-A

MW M025-A is located to the south of the OU-3 landfill area, and near the western shoreline of Alameda Point (see Figure 1-3). Cyanide was detected in samples collected in 1991 at a concentration that could pose a threat to aquatic receptors in this area. The well was not analyzed for cyanide at low sample quantitation limits (SQL) during subsequent sampling events. Therefore, duplicate samples collected from MW M025-A were analyzed for cyanide to determine whether unacceptable risks to aquatic receptors in the San Francisco Bay potentially exist at this location.

Groundwater samples were not collected at MW M001-E during the data gap sampling, which also had historic detection of cyanide. This well was included in a year-long quarterly sampling program at Alameda Point during 1991 and 1992. Cyanide concentrations exceeded the ambient water quality criteria (AWQC) based screening value (10 µg/L) in two (12 and 12.8 µg/L) quarterly groundwater samples collected from this location. Cyanide was not detected above the screening value in groundwater samples collected during two quarters of monitoring. However, the HHRA presented in the final OU-3 RI (TtEMI 1999) indicated that potential risks are within acceptable levels, based on a four-quarter average value. Therefore, this well was not sampled during the data gap investigation.

Groundwater Quality Verification - M028-A

MW M028-A is located immediately outside of the western boundary of landfill cells, within a groundwater hot-spot identified during the RI (see Figure 1-3). Historic sampling records indicated that samples from the well had been analyzed for VOCs, semivolatile organic compounds (SVOC), pesticides, petroleum hydrocarbons, dissolved metals, and radioisotopes. Data from the samples assisted in the

identification of the groundwater hot-spot in this area of the site and associated COCs. MW M028-A was sampled during the data gap investigation to determine current COC concentrations (toluene; xylenes; 1,2-DCE; 2,4-DMP; and 2-methylphenol). General chemical parameters were also measured at this well to identify constituents important to the remediation effort, because inorganic chemical characteristics can affect the efficiency of potential remedial technologies.

1.2.3 Landfill Gas

Historical records indicated that seven individual landfill cells and a former burn area were located in OU-3. Therefore, a landfill gas (LFG) investigation was conducted to determine whether methane was present that would require vents to be installed in any areas of the landfill. Landfill gas sampling consisted of two components in the data gap investigation. First, shallow, subsurface probes were installed to a depth of about 3 feet bgs to determine whether methane was present and to identify other landfill gas VOCs. Second, surface flux measurements were collected to determine the extent of diffusive transport of VOCs through existing soil cover in the landfill area.

Landfill gas characterization will be used in the FS process to determine whether venting is necessary at OU-3 and to aid in the design of the proposed landfill containment remedy. Flux chamber measurements also provided site-specific ambient air quality data used to qualitatively verify the HHRA results presented in the Final OU-3 RI Report (TtEMI 1999).

1.2.4 Existing Soil Cover

Records indicated that disposal operations at the OU-3 landfill were terminated in 1956; however, landfill closure documents were not available. During the data gap investigation, shallow soil samples were collected to determine the thickness and geotechnical parameters of the existing landfill cover. The data may aid in the proposed remedial system design. Borings were advanced and soil samples were collected using direct-push technology. Samples were collected in clear, acetate liners to allow visual inspection of the samples to determine the cover-refuse interface. Samples were then submitted for laboratory analyses of geotechnical parameters, including moisture content, density, and allowable bearing capacity.

The Navy intends to follow up the preliminary geotechnical investigation results presented herein with a comprehensive geotechnical and seismic hazard evaluation to support containment design requirements and identify land reuse construction limitations. These studies are currently scheduled for early in the

calendar year 2001. Results of this analysis will be presented in Volume III of the OU-3 RI Report Addendum.

2.0 INVESTIGATION RESULTS

One hundred and twelve samples were collected at the Site to address identified data gaps. These samples included 29 quality assurance (QA) and quality control (QC) samples consisting of field blank (5), trip blank (3), duplicate (16), background (1), control (1), source water (1), and rinsate (2) samples. Characterization samples were distributed as follows: 20 groundwater samples were collected from shoreline locations; 6 groundwater samples were collected from three locations east of the groundwater hot-spot; 1 groundwater sample was collected from both Monitoring Well (MW) M025-A and MW M028-A; 31 subsurface landfill gas samples were collected from seven landfill cells and the former burn area; 15 gas flux samples were collected at the landfill and former burn area; and 9 shallow soil samples were collected from nine locations within the landfill areas. Tables 1-2a through 1-2c presented additional details of samples collected during the data gap investigation.

2.1 GROUNDWATER

Complete groundwater analytical results are presented in Appendix B. The Navy intends to prepare and implement a basewide, long-term groundwater monitoring plan (LTM). This will provide additional assessment, remedial action performance, and compliance data for groundwater at Alameda Point.

Screening level ecological risk values were developed for groundwater at OU-3 using a two-step process. First, the most appropriate ecological reference value (ERV) was determined from the literature. Second, a screening value was developed based on the corresponding ERV. These screening levels were compared to groundwater concentrations to determine if the detected concentration posed an unacceptable risk to aquatic receptors.

Because the Bay is the receptor of groundwater discharge from Site 1, ERVs are used as a basis for the screening values, rather than screening values based on potential impacts to human health. ERVs are valid reference values based on scientific literature. These values represent the concentration, from the point of groundwater discharge to surface water, at which the vast majority of organisms would not be adversely affected by the concentrations present.

Marine criteria are considered to be the most appropriate and are used wherever possible. However, for many compounds, marine criteria are not available; in some cases, only freshwater criteria are available. A prioritization scheme was used where the highest quality and most relevant criterion available for a

particular compound was used as the basis for the ERV. This prioritization scheme is as follows from most applicable reference value: marine chronic ambient water quality criteria (AWQC); marine acute AWQC divided by 10 (to convert from acute to chronic); EPA Region IV chronic saltwater screening levels; freshwater chronic AWQCs; EPA Region IV surface water criteria; and Oak Ridge National Laboratory (ORNL) Tier II screening values.

All compounds detected in shoreline samples were compared to ERV-based screening levels developed in the OU-3 RI Report (TtEMI 1999a). The Navy is using standard National Oceanic and Atmospheric Administration (NOAA) practice in applying a 10-fold dilution factor to the ERV, as recommended by NOAA in the Screening Quick Reference Tables (Buchman 1999). The introduction to these tables states:

> "...given the dilution expected during migration and upon discharge of groundwater to surface water, CRPD [Coastal Protection & Restoration Division] uses 10 times the applicable AWQC for screening."

Based on precedent established by NOAA guidance, the 10 to 1 dilution factor used for ecological COCs is considered protective of ecological receptors in the Bay.

2.1.1 Groundwater Shoreline Sampling

Table 2-1 presents analytical results from the shoreline groundwater sampling locations for volatile organic compounds (VOC) and semivolatile organic compounds (SVOC). COC concentrations detected in shoreline Hydropunch® samples are shown on Figure 2-1. Detected results for all COCs identified in the OU-3 RI were lower than the ERV-based screening levels.

Phenanthrene was not identified as a COC in the OU-3 RI Report. A marine chronic AWQC is available for phenanthrene, which results in a ERV-based screening criteria of 46 µg/L. Phenanthrene (120 µg/L) was detected above the ERV-based screening level in an HP sample collected at 5-feet-bgs at Sampling Location HP-S01-B3, in the northern portion of the site. A second sample collected at the same location at 15-feet-bgs did not contain phenanthrene above the laboratory detection limit. While the concentration of phenanthrene at the 5-foot-bgs interval of HP-S01-B3 exceeded the ERV-based screening level, a significant risk to ecological receptors in San Francisco Bay from the concentration of phenanthrene detected is unlikely for the following reason:

HP-S01-B3	5 feet
Naphthalene	780 (ERV=620)
Phenanthrene	120 (ERV=46)

HP-S01-B5	5 feet	15 feet
2,4-Dimethylphenol	<10	6
Xylenes	<10	23

HP-S01-B8	5 feet	15 feet
1,2-Dichloroethene	<10	16(15)

HP-S01-B3
HP-S01-B4 <10
HP-S01-B2 <10
HP-S01-B1 <10
HP-S01-B9 <10
HP-S01-B5
HP-S01-B6 <10 STM
HP-S01-B7 <10
HP-S01-B8 111

M2A
M002-A
M002-E
M001-E
M001-B
M001-A
M003-A
M003-B
M003-E
M030-C
M030-E
M030-A
M004-A
M029-E
M029-A
M033-A
M028-E
M034-A
M028-E-OLD
M028-A
M028-C
M035-A
M031-P
M031-C
M031-A
M031-E
M027-B
M027-E
M027-A
M027-C
M026-E
M026-A

LANDFILL
LANDFILL
FORMER BURN AREA BOUNDARY

339

SIM
SS

LEGEND

- MONITORING WELL LOCATION
- PROPOSED GROUNDWATER LOCATION
- PAVED ROAD OR PARKING LOT
- BUILDING, CONCRETE, PAVED, OR COVERED AREA
- 517 BUILDING AND BUILDING NUMBER
- IR SITE BOUNDARY
- GROUNDWATER HOT SPOT LOCATION
- GROUNDWATER FLOW DIRECTION

ALL AQUEOUS CONCENTRATIONS IN ug/L

100' 0 100' 200'
SCALE: 1" = 200'

FIGURE 2-1
OU-3 GROUNDWATER SHORELINE
ALAMEDA POINT
ALAMEDA, CALIFORNIA

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DATE: 12/4/00

TABLE 2-1

OPERABLE UNIT 3 GROUNDWATER
SHORELINE
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Location	HP-S01-B1		HP-S01-B2		HP-S01-B3		HP-S01-B4		HP-S01-B5		HP-S01-B6		HP-S01-B7		HP-S01-B8		HP-S01-B9		
Sample Identification	122-S01-001[a]	122-S01-002[a]	122-S01-003	122-S01-004	122-S01-005	122-S01-006	122-S01-007	122-S01-008	122-S01-009	122-S01-010	122-S01-011	122-S01-012	122-S01-013	122-S01-014	122-S01-015	122-S01-016	122-S01-017	122-S01-018	Screening
Elevation Collected	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	5 feet	15 feet	Value
VOC (µg/L)																			
Benzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	16	<10	<10	<10	<10	<10	<10	<10	<10	7,000
Chlorobenzene	<10	<10	<10	<10	<10	<10	<10	7	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	1,290
1,2-Dichloroethene (total)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	16 (15)	<10	<10	224,000
Ethylbenzene	<10	<10	<10	<10	<10	<10	<10	<10	<10	6	<10	<10	<10	<10	<10	<10	<10	<10	430
Trichloroethene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	7 (8)	<10	<10	2,000
Xylene (total)	<10	<10	<10	<10	<10	<10	<10	<10	<10	23	<10	<10	<10	<10	<10	<10	<10	<10	130
SVOC (µg/L)																			
2,4-Dimethylphenol	<10	<10	<10	<10	<11	<10	<10	<10	<10	6	<10	<10	<10	<10	<10	<10	<10	<10	2,120
2-Methylnaphthalene	<10	<10	<10	<10	180	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	300
Acenaphthene	<10	<10	<10	<10	160	9	<10	6	3	<10	<10	<10	<10	<10	<10	<10	<10	<10	7,100
Anthracene	<10	<10	<10	<10	11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	300
Carbazole	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NV
Dibenzofuran	<10	<10	<10	<10	63	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	37
Fluoranthene	<10	<10	<10	<10	15	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	160
Fluorene	<10	<10	<10	<10	68	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	300
Naphthalene	<10	<10	<10	<10	780	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	2,350
Phenanthrene	<10	<10	<10	<10	120	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	46
Pyrene	<10	<10	<10	<10	11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	300

Notes:

[a] Semivolatile analysis results reported are for resamples 122-S01-147 (HP-S01-B1-5) and 122-S01-148 (HP-S01-B1-15) resulting from broken sample collection bottles for this analysis on original sampling of Location B1.

Ecological reference value-based screening levels listed are ambient water quality criteria (AWQC) or alternate reference values multiplied by ten

VOC = Volatile organic compound
SVOC = Semivolatile organic compound
µg/L = Micrograms per liter
HP = Hydropunch sample
( ) = results for duplicate sample
NV = No value

The higher concentration of phenanthrene was detected in a single sample from one depth interval. While phenanthrene was previously detected at the site, concentrations detected were at least one order of magnitude lower than concentrations detected in the sample from the 5-foot-bgs level of Sampling Location HP-801-B3. Concentrations of phenanthrene in groundwater exceeding the conservative screening level are therefore very limited in areal extent.

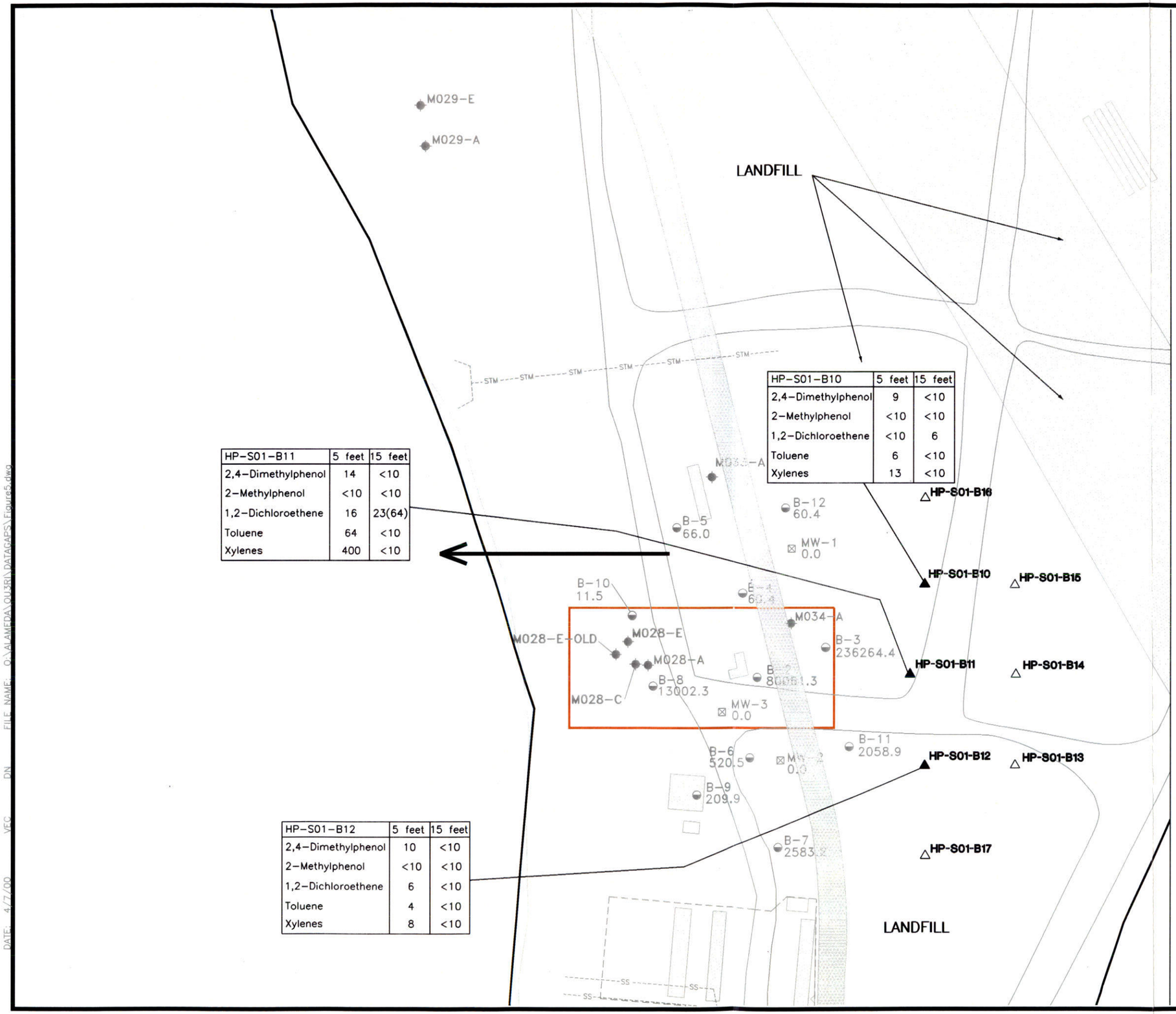
2.1.2 Groundwater Hot-spot - Eastern Boundary Sampling

Figure 2-2 shows eight direct-push sampling locations used to identify the eastern boundary of the groundwater hot-spot (HP-S01-B10 through HP-S01-B17). These included three primary sampling locations (HP-S01-B10 through HP-S01-B12) and five conditional, step-out sampling locations based on field screening results (HP-S01-B13 through HP-S01-B17). Groundwater sample collection was performed using direct-push technology at about 5 and 15 feet bgs within the FWBZ.

Six groundwater samples collected from the three primary locations (122-S01-021 through 122-S01-027) were screened in the field for organohalide concentration. Organohalide concentration above 5,900 µg/L indicated the potential presence of 1,2-DCE above the ERV-based screening level, as established in the QAPP (TtEMI 2000b) as the decision rule for step-out sample collection. Three step-out sampling locations were marked 75 feet east of the primary locations. One step-out sampling location was marked 75 feet north, and one was marked 75 feet south from the northernmost and southernmost primary sampling locations, respectively.

Field screening tests for chlorinated VOCs (Quick Test®) at the primary sampling locations (see Table 2-2) did not indicate VOCs present at concentrations above the decision rule established in the QAPP. The results indicated that COCs associated with the groundwater hot-spot were not present at concentrations above ERV-based screening level east of the primary locations and that step-out sample collection was not necessary.

Fixed laboratory results for VOCs and SVOCs by EPA contract laboratory program (CLP) Method OLM03.1 (EPA 1994b) for the primary sampling locations are summarized in Table 2-3. Table 2-3 has been modified to accurately present the ERV-based screening levels for VOCs and SVOCs at OU-3. The modification to ERV-based screening levels is a result of updated AWQC that are based on the latest scientific literature.



HP-S01-B10	5 feet	15 feet
2,4-Dimethylphenol	9	<10
2-Methylphenol	<10	<10
1,2-Dichloroethene	<10	6
Toluene	6	<10
Xylenes	13	<10

HP-S01-B11	5 feet	15 feet
2,4-Dimethylphenol	14	<10
2-Methylphenol	<10	<10
1,2-Dichloroethene	16	23(64)
Toluene	64	<10
Xylenes	400	<10

HP-S01-B12	5 feet	15 feet
2,4-Dimethylphenol	10	<10
2-Methylphenol	<10	<10
1,2-Dichloroethene	6	<10
Toluene	4	<10
Xylenes	8	<10

FIGURE 2-2
OU-3 GROUNDWATER HOT SPOT BOUNDARY
ALAMEDA POINT
ALAMEDA, CALIFORNIA

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TABLE 2-2

OPERABLE UNIT 3 GROUNDWATER HOT-SPOT BOUNDARY - FIELD SCREENING
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Sample Identification	Location	Envirometer Reading (µg/L)[a]
122-S01-021	HP-S01-B10-5	37
122-S01-022	HP-S01-B10-15	0.7
122-S01-023	HP-S01-B11-5	32
122-S01-024	HP-S01-B11-15	13.5
122-S01-027	HP-S01-B11-15D	13.8
122-S01-025	HP-S01-B12-5	7.8
122-S01-026	HP-S01-B12-15	6.6

Notes:

[a] The field test kit was calibrated and standardized to trichloroethene; the screening level was 5,900 micrograms per liter.

µg/L = Micrograms per liter

D = Duplicate

HP = Hydropunch sample

TABLE 2-3

OPERABLE UNIT 3 GROUNDWATER HOT-SPOT BOUNDARY - FIELD LABORATORY
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Location	HP-S01-B10		HP-S01-B11		HP-S01-B12		
Sample Identification	122-S01-021	122-S01-022	122-S01-023	122-S01-024	122-S01-025	122-S01-026	Screening Value[a]
Depth Collected (feet bgs)	5	15	5	15	5	15	
VOC (µg/L)							
Benzene	17	<10	15	<10	8	<10	7,000
1,2-Dichloroethene (total)	<10	6	16	23 (64)	6	<10	224,000
Ethylbenzene	5	<10	120	<10	<10	<10	430
Toluene	6	<10	64	<10	4	<10	1,750
Trichloroethene	<10	<10	<10	9 (<10)	<10	<10	2,000
Vinyl Chloride	<10	<10	26	<10	<10	<10	NV
Xylene (Total)	13	<10	400	<10	8	<10	130
SVOC (µg/L)							
1,2-Dichlorobenzene	<6	<5	18	<5	<5	<5	158
2,4-Dimethylphenol	9	<10	14	<10	10	<10	2,120
2-Methylnaphthalene	5	<10	20	<10	<10	<10	300
2-Methylphenol	<10	<10	<10	<10	<10	<10	130
Acenaphthene	<11	<10	3	<10	<10	<10	7,100
N-Nitrosodiphenylamine (1)	3	<10	<11	<10	<10	<10	585
Naphthalene	14	<10	63	<10	<10	<10	2,350

Notes:

[a] Ecological reference value-based screening levels listed are ambient water quality criteria (AWQC) or alternate reference values multiplied by ten.

VOC = Volatile organic compound

SVOC = Semivolatile organic compound

µg/L = Micrograms per liter

HP = Hydropunch sample

NV = No value

( ) = Results for duplicate sample

bgs = Below ground surface

Xylene (400 µg/L) was detected above the ERV-based screening level in a sample collected at 5-feet-bgs at Sampling Location HP-S01-B11. A second sample collected at the same location at 15-feet-bgs did not contain xylene above the method reporting limit (MRL). Analytical results for COCs identified in the Final OU-3 RI Report are posted in Figure 2-2. These results concur with field screening and indicate that the eastern boundary of the groundwater hot-spot is located west of Sampling Locations HP-S01-B10 through HP-S01-B12.

2.1.3 Groundwater Verification Sampling

M025-A

The total depth of MW M025-A is 14.5 feet, with a screened interval in the FWBZ between 4 and 14 feet bgs. M025-A was sampled in duplicate (122-S01-118 and 122-S01-120, [See Table 1-2b]) during the data gap investigation and analyzed for cyanide by EPA CLP ILM04.0 (EPA 1995).

Cyanide was not detected above the reporting limit of 10 µg/L (equal to the ERV-based screening level developed in the RI Report) in either of the two samples (see Table 2-4).

M001-E

A year-long quarterly monitoring program was performed at OU-3 between June 17, 1991, and March 27, 1992. Cyanide was detected at MW M001-E above the ERV-based screening level (10 µg/L) in groundwater samples collected during the second and fourth quarter (12 and 12.8 µg/L, respectively). Cyanide was not detected above the MRL in groundwater samples collected during the first and third quarter (MRL equal to 10 and 5 µg/L, respectively). This well was not resampled during the OU-3 data gap sampling investigation. Existing wells at OU-3 will be considered for inclusion in the forthcoming groundwater long-term monitoring program. The groundwater monitoring plan will identify monitoring wells to be sampled within OU-3, analytical suites to be included in the monitoring, frequency of monitoring, and conditions under which components of the monitoring plan may be modified.

M028-A

MW M028-A has a total depth of 14.5 feet, with a screened interval in the FWBZ between 4 and 14 feet bgs. Samples 122-S01-119 and 122-S01-121 (See Table 1-2b) were collected from MW M028-A and

TABLE 2-4

OPERABLE UNIT 3 GROUNDWATER MONITORING WELL M025-A
ALAMEDA POINT
ALAMEDA, CALIFORNIA

M025-A	UNITS	122-S01-118	122-S01-120
Cyanide	µg/L	<10	<10

Note:
µg/L = Micrograms per liter

analyzed for VOCs and SVOCs by EPA CLP OLM03.1 (EPA 1994b); oil and grease by SW-846 Method 9070 (EPA 1996); total suspended solids by Standard Method 2540D (American Public Health Association [APHA] 1992); turbidity by Standard Method 2130B (APHA 1992); alkalinity by EPA Method 310.1 (EPA 1983); sulfide by EPA Method 376.2 (EPA 1983); nitrate by EPA Method 353.1 (EPA 1983); hexavalent chromium by SW-846 Method 7196A (EPA 1996); chromium by EPA CLP ILM04.0 (EPA 1995); and ferrous iron using the Hach Field Kit. Analytical results from duplicate samples are summarized in Table 2-5.

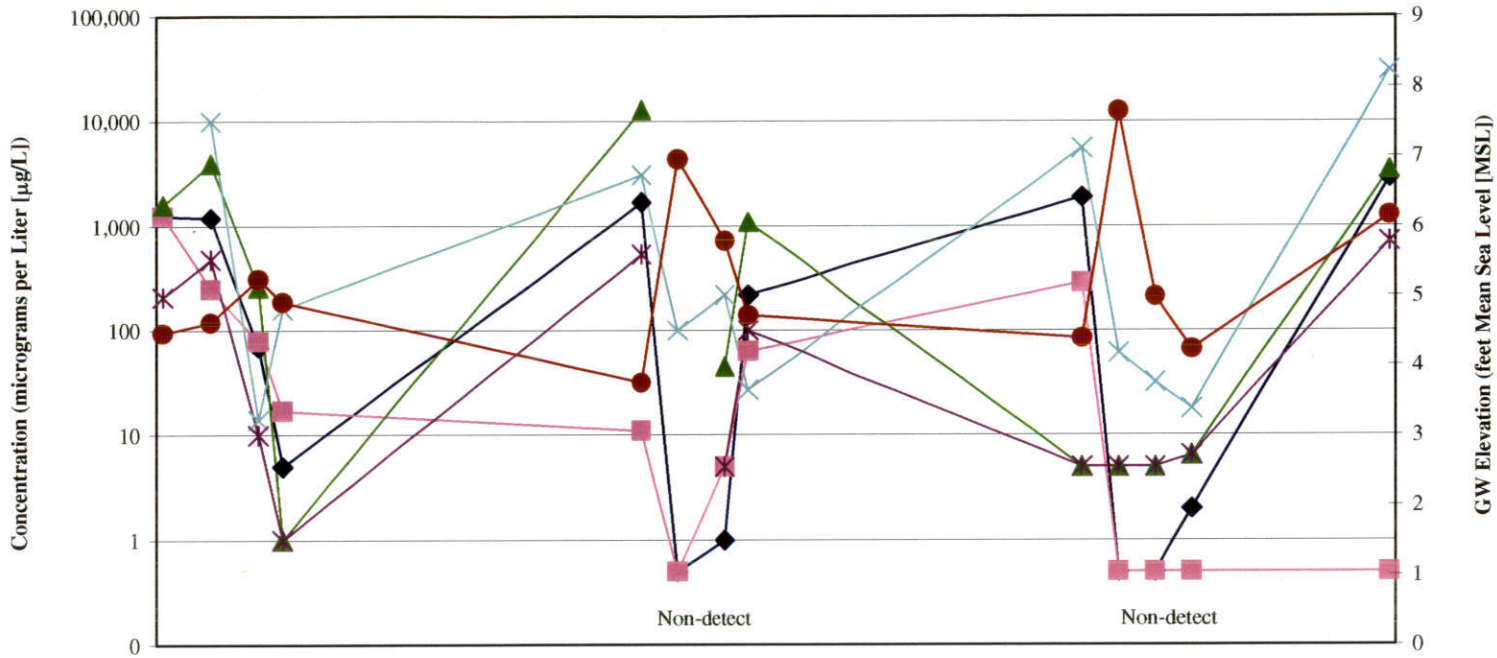
Historic groundwater concentrations of COCs at monitoring well MO28-A, including the average of duplicate samples from the data gap investigation, are presented in Figure 2-3. VOCs and SVOCs detected at the well during data gap sampling were generally in the range of historic concentrations. Concentrations for toluene, 2-methylphenol, and 1,2-DCE detected in the samples collected during this investigation were, however, above historic concentrations at MW M028-A. This will not affect remedial alternative selection, because all technologies considered in the Draft FS Report are capable of removing COCs at reported concentrations.

2.2 LANDFILL GAS

Landfill gas characteristics were not previously evaluated at the OU-3 landfill. Methane associated with the decomposition of biodegradable solid waste can pose an explosion or asphyxiation hazard. VOCs associated with emissions from mixed waste can present a human health or ecological risk. It is required that landfill gases be collected and potentially treated if methane and VOCs are present in concentrations that pose a hazard to human or ecological receptors.

The Navy employed the services of Dr. C.E. Schmidt to perform landfill gas characterization and collect emissions data at OU-3 landfill areas. A landfill gas survey was performed by Interphase Environmental, Inc., as a subcontractor to Dr. Schmidt, with his personal oversight. Field laboratory results for the landfill gas survey are tabulated Appendix C. Dr. Schmidt performed surface flux measurements himself and submitted the samples to the fixed laboratory. Complete analytical results for flux chamber sampling and fixed-laboratory verification of field laboratory results are presented in Appendix D. Details regarding flux chamber sampling employing Summa canisters and fixed laboratory analyses are presented in the Revised Draft Technical Memorandum (see Appendix E).

FIGURE 2-3
OPERABLE UNIT 3 (OU-3) GROUNDWATER
HISTORIC CONCENTRATION OF CHEMICALS OF CONCERN (COC) AT MONITORING WELL M028-A
ALAMEDA POINT, ALAMEDA, CALIFORNIA



	6/24/1991	10/11/1991	2/4/1992	4/27/1992	10/10/1994	1/27/1995	5/8/1995	7/20/1995	11/7/1997	2/3/1998	5/4/1998	8/3/1998	12/9/1999
TOLUENE	1,250	1,200	69	5	1,700	0.5	1	220	1,900	1	1	2	2,900
XYLENE	1,250	250	78	17	11	0.5	5	63	290	1	1	1	1
2,4-DIMETHYLPHENOL	1,600	4,000	260	1	13,000	N/A	45	1,100	5	5	5	7	3,500
1,2-DICHLOROETHENE	N/A	10,000	14	160	3,100	100	220	27	5,600	61	32	18	31,000
2-METHYLPHENOL	210	480	10	1	540	N/A	5	100	5	5	5	7	720
GW Elevation	4.46	4.615	5.24	4.91	3.75	6.96	5.79	4.72	4.39	7.65	4.99	4.23	6.16

NOTES:

1. One-half of the value of the detection limit was used for graphical presentation of non-detect results.
2. Discontinuous links between sampling events indicate that no results were available NA.

GW Groundwater
NA Not analyzed

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TABLE 2-5

OPERABLE UNIT 3 GROUNDWATER MONITORING WELL M028-A
ALAMEDA POINT
ALAMEDA, CALIFORNIA

MW M028-A	UNITS	122-S01-119	122-S01-121
Inorganic Parameters			
Alkalinity	µg/L	400	396
Alkalinity, soluble	µg/L	401	419
Sulfide	µg/L	2.1	2
Sulfide, soluble	µg/L	4.8	5
Nitrate	µg/L	<0.1	0.12
Nitrate, soluble	µg/L	<0.1	<0.1
Chromium	µg/L	<2.6	<2.6
Chromium - Total	µg/L	<2.6	<2.6
Chromium VI	µg/L	<0.02	<0.02
Chromium VI-soluble	µg/L	<0.02	<0.02
Ferrous Iron[a]	mg/L	4.0	3.8
Oil and Grease (gravimetric)	µg/L	<6.0	<6.1
Total Suspended Solids	µg/L	51	51
Turbidity	NTU	140	132
VOA			
Vinyl Chloride	µg/L	48,000	41,000
1,2-Dichloroethene (total)	µg/L	32,000	30,000
Toluene	µg/L	3,000	2,800
SVOA			
1,4-Dichlorobenzene	µg/L	6	<5
1,2-Dichlorobenzene	µg/L	32	17
2-Methylphenol	µg/L	1,000	440
4-Methylphenol	µg/L	190	63
2,4-Dimethylphenol	µg/L	4,900	2,100
Naphthalene	µg/L	43	6
Phenol	µg/L	9	<10
Diethylphthalate	µg/L	<10	<10

Notes:

[a] Unfiltered samples analyzed using colorimetric field test kit for ferrous iron

µg/L = Micrograms per liter

mg/L = Milligrams per liter

MW = Monitoring well

NTU = Nephelometric turbitity units

SVOA = Semivolatile organic analysis

VOA = Volatile organic analysis

2.2.1 Landfill Gas Survey

Temporary sample collection probes were installed, using direct-push technology, to a target depth of 3 feet bgs. Four landfill gas samples were collected within each of the cells and the former burn area, with the single exception of the north-central cell (see Figure 1-3). This area is covered with asphalt and concrete paving associated with the northwest runway, which limited potential sampling locations. The two sampling locations within this cell were on the asphalt runway apron in the southwestern and northeastern corners of the cell. Samples were analyzed using an on-site mobile laboratory by modified EPA SW-846 Methods 8010 and 8020 (equivalent to EPA SW-846 Method 8021B) for VOCs (EPA 1996) and methane by American Society for Testing and Materials (ASTM) Method D-1945 (ASTM 1997).

Field laboratory verification samples were collected and analyzed at a fixed laboratory by ASTM Method D-1945 (ASTM 1997) for methane and by Compendium Method TO-14 (EPA 1988a) for VOCs at three locations (SG-S01-B9, SG-S01-B10, and SG-S01-B15). Verification samples submitted to the fixed laboratory were handled by C.E. Schmidt to provide independent QC information. A comparison of fixed and field laboratory results for these locations is presented in Table 2-6.

The sampling protocol outlined in the Field Sampling Plan (FSP) was followed for both sample collection and analyses; however, analytical results for methane did not compare well between the field and fixed laboratory. Methane was detected at 29 percent by volume in the field laboratory and 50 percent by volume in the fixed laboratory from Sampling Location SG-S01-B9. Methane was not detected above the SQL (0.001 percent by volume [% v/v]) in the sample analyzed in the field laboratory for Sampling Location SG-S01-B15, while the fixed laboratory reported 51 percent by volume in the verification sample. Field and fixed laboratory results for samples collected at Sampling Location SG-S01-B10 were, however, reported at nearly identical values of 4.1 and 4.2% v/v.

Samples submitted to the field laboratory for analyses were collected in a 10-milliliter gastight syringe, and analytical instruments provided a detection limit on the order of thousands of micrograms per cubic meter for 23 target analytes. In contrast, fixed-laboratory samples were collected in 6-liter Summa canisters, and reporting limits were on the order of micrograms per cubic meter for 64 target analytes. Standard and confirmatory landfill gas samples were collected during the same episode at each location. The different sampling methods and collection containers used could account for inconsistencies in

TAB -6

TABLE 2-6

OPERABLE UNIT 3 LANDFILL GAS FIXED AND FIELD LABORATORY COMPARISON
ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 1 of 1)

ANALYTE	UNITS	SG-S01-B9-3		SG-S01-B10-3		SG-S01-B15-3	
		122-S01-056	122-S01-056D	122-S01-058	122-S01-058D	122-S01-068	122-S01-068D
Methane	% v/v	29	50	4.1	4.2	<0.001	51
Acetone	µg/m^3	<5,000	<58	<5,000	<5,800	<5,000	240
Benzene	µg/m^3	<1,000	140	<1,000	4,300	<1,000	17
Cyclohexane	µg/m^3	NA	740	NA	<8,200	NA	<2.2
Chloromethane	µg/m^3	NA	<0.27	NA	<1,000	NA	<2.8
cis-1,2-Dichloroethene	µg/m^3	<1,000	68	<1,000	<1,900	<1,000	<0.52
Ethylbenzene	µg/m^3	<1,000	49	8,000	3,900	<1,000	40
4-Ethyltoluene	µg/m^3	NA	<3.3	NA	<12,000	NA	43
Hexane	µg/m^3	NA	250	NA	32,000	NA	70
Heptane	µg/m^3	NA	<2.8	NA	210,000	NA	870
Methylene Chloride	µg/m^3	NA	<0.46	NA	8,700	NA	<0.46
2-Propanol	µg/m^3	NA	<1.6	NA	28,000	NA	<1.6
Toluene	µg/m^3	<1,000	<190	1,700	<4,600	<1,000	67
1,3,5-Trimethylbenzene	µg/m^3	NA	57	NA	4,700	NA	33
1,2,4-Trimethylbenzene	µg/m^3	NA	<23	NA	<2,400	NA	<110
Vinyl Chloride	µg/m^3	<1,000	1,500	<1,000	<1,200	<1,000	<0.34
Xylene	µg/m^3	<1,000	170	25,000	9,200	<1,000	130

Notes:

D = Indicates fixed-laboratory verification sample
µg/m^3 = Micrograms per cubic meter
% v/v = Percent by volume
NA = Not analyzed
SG = Soil gas sample

collection of a representative duplicate. Additionally, the volume of sample collected may have influenced concentration results because of dilution or spiking based on isolated ambient sample volumes.

VOC results reported for the field and fixed laboratory agreed more closely. Comparison of these results did not, however, provide strong evidence of precision. The following reasons may have contributed to lack of precision in the data: (1) the analytical protocol employed for field analyses provided an abbreviated list of target analytes and (2) the analytical protocol employed in the field laboratory provided high detection limits. The lack of reproducible results suggested inconsistencies in achieving uniform sample collection and/or analysis between field laboratory and fixed-laboratory protocols.

Limited conclusions are presented in the following text with respect to the landfill gas survey, because the quality of field results was questionable and fixed-laboratory sampling locations were limited in scope. An additional landfill gas investigation, using an alternative sampling protocol and analytical techniques consistent with best available technology, and consistent sampling methods for verification sample collection will be necessary for efficient design of a landfill containment and venting system. Methane and VOC concentrations are discussed independently in the following sections.

2.2.1.1 Methane

Characterization of landfill gas is required at landfill sites to assess the presence of methane. The Resource Conservation and Recovery Act Code of Federal Regulations 258.23(a) states that the methane standard for landfills is a maximum of 5 percent at the facility boundary (landfill limit) and 1.25 percent (25 percent of the lower explosive limit (LEL) value) in any facility structure. Methane concentrations above these values pose an explosion hazard at the site.

Methane was detected in 17 of 31 sampling locations (See Figure 2-4). Reported methane concentrations at SG-S01-B6, SG-S01-B9, SG-S01-B10, SG-S01-B11, SG-S01-B18, and SG-S01-B26 were above 1% v/v. Methane concentrations near the LEL were reported at only two locations, SG-S01-B11 (4.1 % v/v) and SG-S01-B10 (4.5 % v/v). Five sampling locations at which methane was detected are located within three landfill cells, indicating that these cells may contain higher municipal solid waste percentages or that degradation was slower in these cells. The sixth location (SG-S01-B26 [3.2 % v/v]), was in the former burn area at the northwestern edge of OU-3. Reported methane concentrations of 0.012 %v/v to nondetect at sampling locations (SG-S01-B24, SG-S01-B25, SG-S01-B27, and SG-S01-B28) surrounding SG-S01-B26, suggested that methane from landfill cells migrated through the refuse and loose soil toward

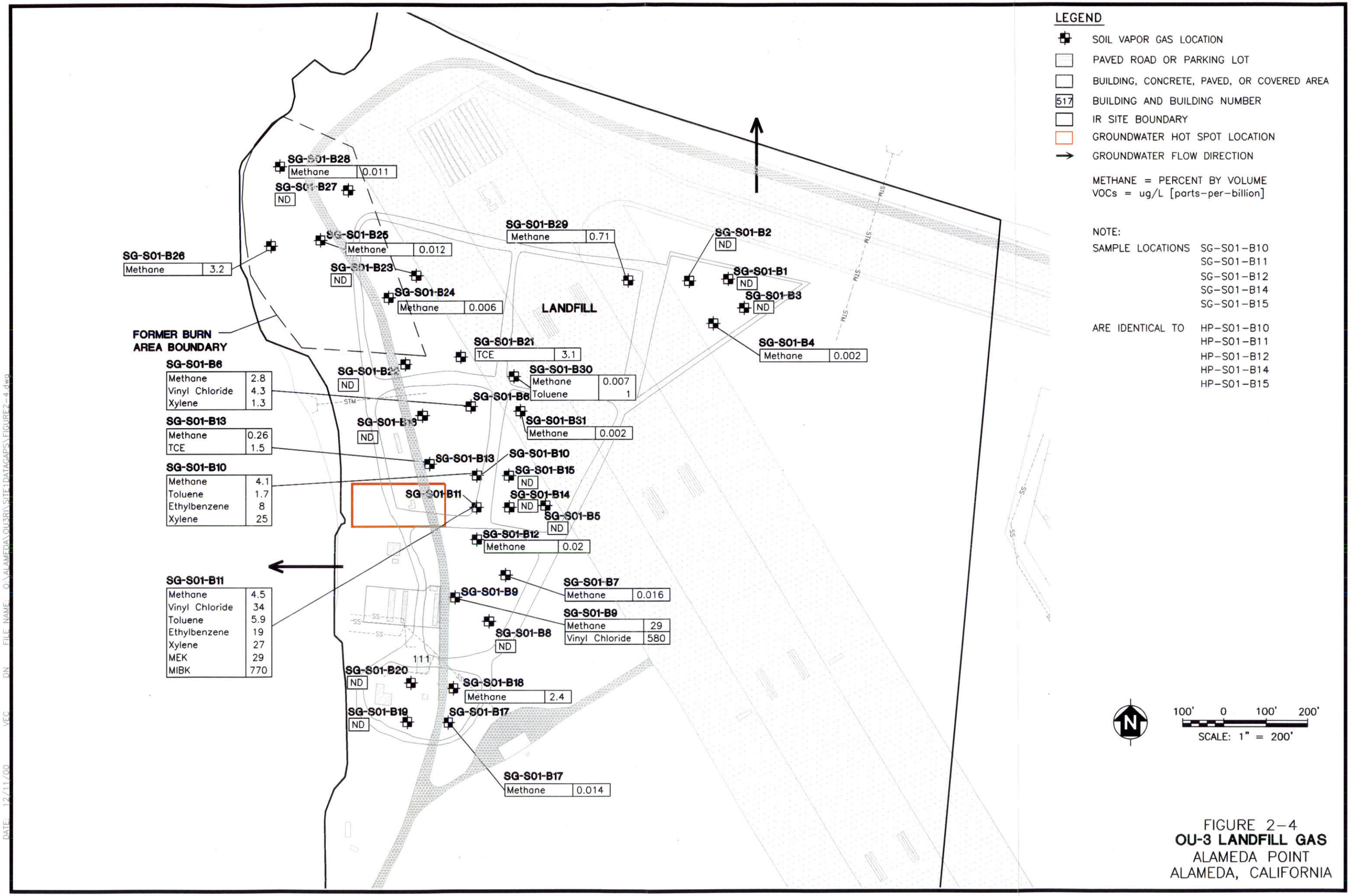

FIGURE 2-4
OU-3 LANDFILL GAS
ALAMEDA POINT
ALAMEDA, CALIFORNIA

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this location. Open burning of refuse near SG-S01-B26 during operation of the landfill reduced methane generation capacity before disposal. Alternatively, methane generation may continue to occur in a small area of the former burn area near SG-S01-B26. The highest methane concentration was detected at Sampling Location SG-S01-B9 (29% v/v).

Landfill gas results indicated that methane was present at OU-3 landfill areas. One detection (SG-S01-B9) exceeded the upper explosive limit and therefore may pose a risk of explosion if concentrations in this area become diluted to within the explosive range. The that soil cover in this area may be less permeable, restricting vapor-phase transport away from the sampling point, or methane generation may continue within this portion of the disposal area, creating relatively high concentrations of methane. Additional, detailed site information is necessary to more fully explain why the reported methane concentration was so high. Five other pockets of methane were identified that exceeded 25 percent of the LEL. Several quarters of passive venting and occasional monitoring will be required to further evaluate conditions in these areas. It is anticipated, based on the methane gas results, that a passive venting system could be necessary for the final containment remedy. Additionally, further landfill gas characterization is necessary.

2.2.1.2 Volatile Organic Compounds

Landfill gas chemical characteristics represent VOCs in dynamic equilibrium with complex subsurface conditions. Volatilization of VOCs into landfill gas is caused by high vapor pressures and relatively low aqueous solubility for many industrial solvents. Significant migration of chemical vapors from a source area is possible. Landfill gas measurements for VOCs provide information regarding chemical compounds in contact with the soil matrix or dissolved into groundwater. VOC results are shown in Figure 2-4 for detected compounds. VOCs were detected in 6 of 31 sampling locations. VOCs were detected primarily near the center of the landfill. Seven compounds were detected in landfill gas: vinyl chloride, toluene, ethylbenzene, xylenes, trichloroethene (TCE), methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK). Five of these compounds had been historically detected at the site in groundwater, with MEK and MIBK being the exceptions.

Landfill gas Sampling Location SG-S01-B11 and groundwater verification Sampling Location HP-S01-B11 were collocated immediately upgradient of the groundwater hot-spot to allow comparison of analytical results of the landfill gas and the groundwater (see Table 2-7). Four VOCs (vinyl chloride, ethylbenzene, toluene, and xylenes) were detected in both the groundwater and landfill gas samples

TABLE 2-7

OPERABLE UNIT 3 GAS AND GROUNDWATER COLLOCATED SAMPLE COMPARISON
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Matrix Depth Collected (bgs)	GW 5 feet	LFG 3 feet
VOC	(µg/L)	(µg/L)
Benzene	15	<1
1,2-Dichloroethene (total)	16	<1
Ethylbenzene	120	19
Toluene	64	5.9
Vinyl Chloride	26	34
Xylene (total)	400	27
MEK (2-Butanone)	<10	29
MIBK (4-Methyl-2-Pentanone)	<10	770

Notes:
Groundwater sample collected at Sampling Location HP-S01-B11
Landfill gas sample collected at Sampling Location SG-S01-B11
GW = Groundwater
LFG = Landfill gas
MEK = Methyl ethyl ketone
MIBK = Methyl isobutyl ketone
bgs = Below ground surface
µg/L = Micrograms per liter
VOC = Volatile organic compound

collected at this location. Compounds detected in groundwater but not in the landfill gas sample were benzene and 1,2-DCE. This is apparently because of the low concentrations detected in groundwater samples, which correspond to small constituent quantities partitioning into the gas phase (below reporting limits). MIBK and MEK were detected in the landfill gas sample but were not present above reporting limits in the groundwater sample (less than 10 μg/L).

Concentrations of toluene (1.7 μg/L), ethylbenzene (8 μg/L), and xylenes (25 μg/L) were detected in the landfill gas sample collected at Sampling Location SG-S01-B10. Vinyl chloride (4.3 μg/L) and xylenes (1.3 μg/L) were detected at Sampling Location SG-S01-B6, and toluene (1 μg/L) was detected at Sampling Location SG-S01-B30. TCE was detected at two locations: SG-S01-B13 (1.5 μg/L), crossgradient from the groundwater hot-spot, and SG-S01-B21 (3.1 μg/L) in the northwestern landfill cell. Vinyl chloride was detected (580 μg/L) in the landfill gas sample collected at Sampling Location SG-S01-B9. VOCs detected at elevated concentrations in the landfill gas correspond with the localized areas of methane discussed in Section 2.2.1.1.

2.2.2 Flux Chamber

Flux measurements quantify the rate of diffusive transport of chemicals through the existing landfill surface. Flux emissions were measured for the landfill surface using the EPA-recommended surface flux chamber. Flux rate data were collected at two of the four locations at which landfill gas samples were collected for each landfill area. One surface flux sampling location per landfill area corresponded with the landfill gas sampling location where maximum total VOC concentrations were reported. A second surface flux sampling location per landfill area corresponded with the landfill gas sampling location where average total VOC concentrations were reported. A single surface flux measurement was performed in the north central landfill cell (see Figure 1-3) because of the presence of asphalt and concrete paving associated with the northwest runway. Two method-specific QC samples were collected for the surface flux chamber sampling event. A background sample was collected to quantify site-specific chemical constituents in ambient air used to flush the chamber. Flushing ambient air at a constant flow rate allows a steady state condition to develop before sample collection. Control point data consisted of two samples collected at different times of the day (0826 and 1436) for Sampling Location SG-S01-B11. These data were used to evaluate possible fluctuation in sample characteristics caused by changing ambient conditions (such as temperature, wind velocity, humidity, and so on) over the 1-day sampling event. Flux chamber samples were collected in evacuated Summa canisters and analyzed for methane by ASTM Method D-1945 (1997) and for 64 target VOCs by EPA Method TO-14 (1988). Emission flux

values in micrograms per square meter per minute (μg/m^2-min) were calculated using Equation 2-1 (see Appendix E for further information):

$$E_x = \frac{QC_x}{A} \qquad \text{(Equation 2-1)}$$

where

E_x	=	emission flux for compound x, micrograms per square meter per minute
Q	=	sweep air flow rate, cubic meters per minute (m^3/min)
C_x	=	concentration of compound x, micrograms per cubic meter
A	=	surface area enclosed by chamber, square meters (m^2)

The sweep rate for the flux chamber was 0.005 m^3/min for all samples, and the surface area of the flux chamber enclosure was 0.13 m^2. Results are tabulated for each compound detected at least once in Table 2-8. Results are described in the following text.

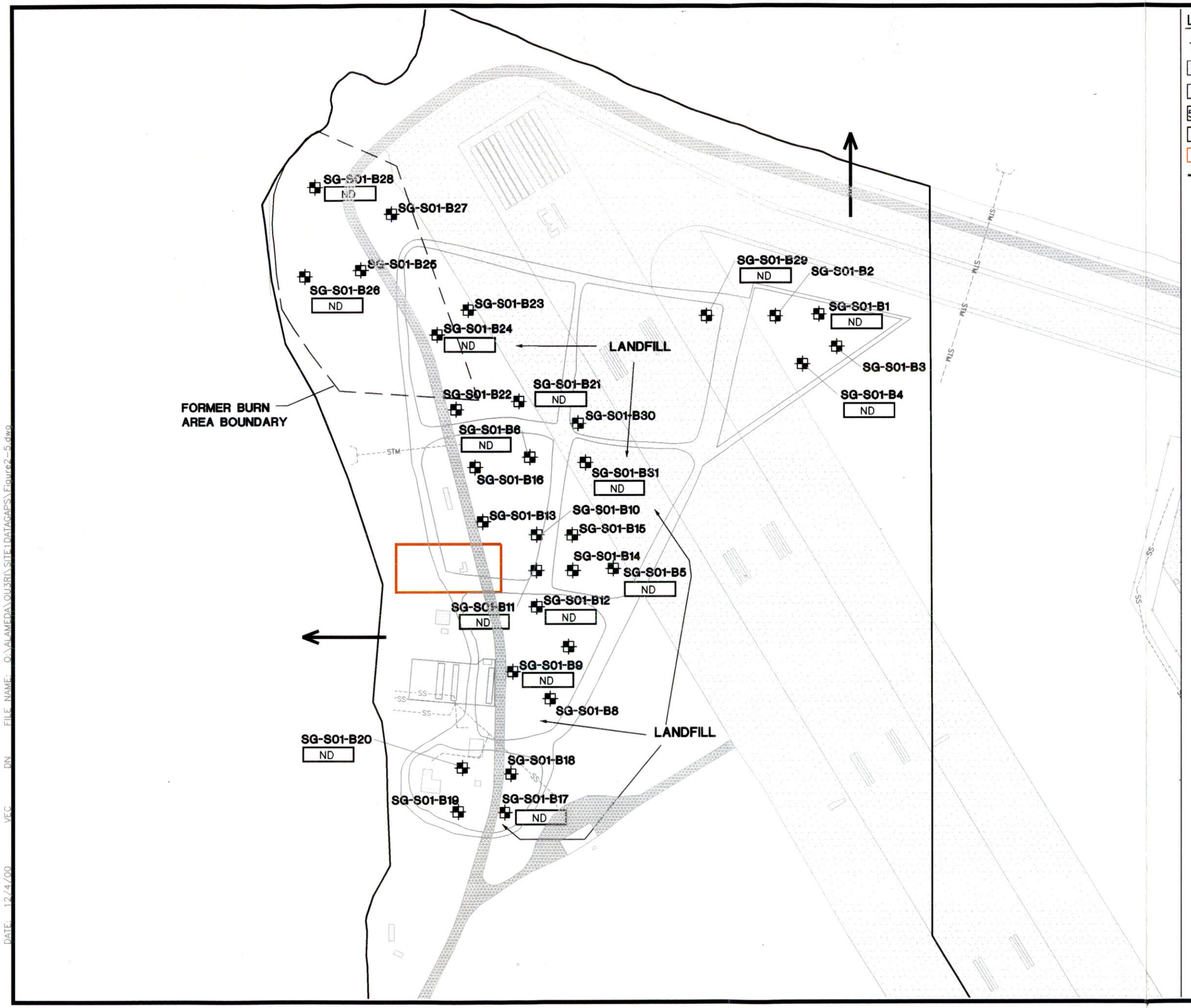
2.2.2.1 Methane

Sampling locations and results are indicated in Figure 2-5. Detectable concentrations were not present above the analytical reporting limits (0.0013% v/v, 780 μg/m^2-min) at any of the 15 surface sampling locations. Nondetect surface flux results indicated that low diffusive transport of methane occurred through the existing soil cover.

2.2.2.2 Volatile Organic Compounds

Diffusive transport of VOCs through the existing soil cover at OU-3 is low (generally less than 1 μg/m^2-min). VOCs were routinely detected in the surface flux measurements at the site, indicating widespread mixing of wastes disposed at the landfill (see Figure 2-6). Twenty-two compounds were detected at the existing ground surface; 15 of these compounds were detected below EPA Region IX ambient air preliminary remediation goals (PRG) (EPA 1999), while 7 compounds were detected above the PRG (See Table 2-9). PRG values are not available for 2-propanol and ethanol, which were also detected at the site.

Samples collected at seven surface flux locations contained 1,4-dioxane concentrations between 0.12 and 0.27 μg/m^2·min. 1,4-Dioxane is considered miscible in water, indicating a capacity to form a uniform blend with water (i.e. very high solubility in water). However, 1,4-dioxane was not detected above the



LEGEND

- SOIL VAPOR GAS LOCATION
- PAVED ROAD OR PARKING LOT
- BUILDING, CONCRETE, PAVED, OR COVERED AREA
- 517 BUILDING AND BUILDING NUMBER
- IR SITE BOUNDARY
- GROUNDWATER HOT SPOT LOCATION
- GROUNDWATER FLOW DIRECTION

DETECTION LIMIT = 780 $\mu g/m^2$ – min.

NOTE:

SAMPLE LOCATIONS SG–S01–B10
SG–S01–B11
SG–S01–B12
SG–S01–B14
SG–S01–B15

ARE IDENTICAL TO HP–S01–B10
HP–S01–B11
HP–S01–B12
HP–S01–B14
HP–S01–B15

FIGURE 2–5
OU-3 SUFACE FLUX METHANE
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DS . 0168 . 15877

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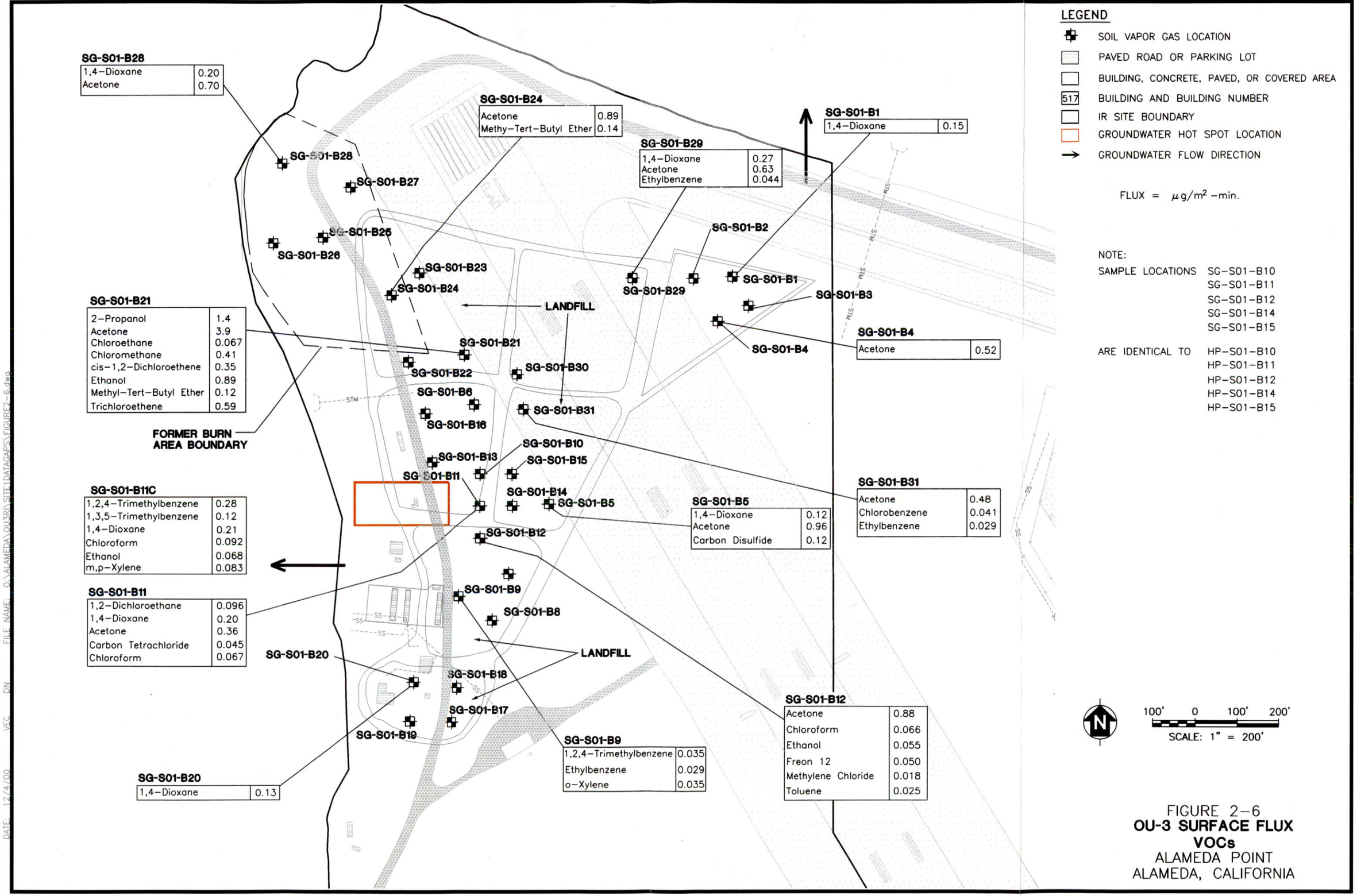

FIGURE 2-6
OU-3 SURFACE FLUX
VOCs
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DS . 0168.15877

TABLE 2-8

OPERABLE UNIT 3 FLUX CHAMBER
ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 1 of 3)

ANALYTE	UNITS	122-S01-045 SG-S01-B4	122-S01-039 SG-S01-B1	122-S01-071 SG-S01-B17	122-S01-077 SG-S01-B20	121-S01-079 SG-S01-B21	122-S01-085 SG-S01-B24
1,2,4-Trimethylbenzene	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.65	<0.7	<0.65	<0.65	<0.65	<0.65
	µg/m^2*min	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,3,5-Trimethylbenzene	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.65	<0.7	<0.65	<0.65	<0.65	<0.65
	µg/m^2*min	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2-Dichloroethane	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.53	<0.57	<0.53	<0.53	<0.53	<0.53
	µg/m^2*min	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
1,4-Dioxane	ppbv	<0.67	**1.1**	<0.67	**0.9**	<0.67	<0.67
	µg/m^3	<2.4	**4.0**	<2.4	**3.3**	<2.4	<2.4
	µg/m^2*min	<0.092	**0.15**	<0.092	**0.13**	<0.092	<0.092
2-Propanol	ppbv	<0.67	<0.68	<0.67	<0.67	**15**	<0.67
	µg/m^3	<1.6	<1.6	<1.6	<1.6	**38**	<1.6
	µg/m^2*min	<0.062	<0.062	<0.062	<0.062	**1.4**	<0.062
Acetone	ppbv	**5.6**	<2.9	<2.0	<3.0	**42**	**9.6**
	µg/m^3	**14**	<7.0	<4.8	<7.2	**100**	**23**
	µg/m^2*min	**0.52**	<0.27	<0.18	<0.27	**3.9**	**0.89**
Carbon Disulfide	ppbv	<0.67	<0.68	<0.67	<0.67	<0.67	<0.67
	µg/m^3	<2.1	<2.2	<2.1	<2.1	<2.1	<2.1
	µg/m^2*min	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081
Carbon Tetrachloride	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.83	<0.90	<0.83	<0.83	<0.83	<0.83
	µg/m^2*min	<0.032	<0.035	<0.032	<0.032	<0.032	<0.032
Chlorobenzene	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.61	<0.66	<0.61	<0.61	<0.61	<0.61
	µg/m^2*min	<0.023	<0.025	<0.023	<0.023	<0.023	<0.023
Chloroethane	ppbv	<0.13	<0.14	<0.13	<0.13	**0.65**	<0.13
	µg/m^3	<0.35	<0.38	<0.35	<0.35	**1.70**	<0.35
	µg/m^2*min	<0.013	<0.015	<0.013	<0.013	**0.067**	<0.013
Chloroform	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.65	<0.70	<0.65	<0.65	<0.65	<0.65
	µg/m^2*min	<0.025	<0.027	<0.025	<0.025	<0.025	<0.025
Chloromethane	ppbv	<0.13	<0.38	<0.13	<0.13	**5.1**	<0.24
	µg/m^3	<0.27	<0.79	<0.27	<0.27	**11**	<0.51
	µg/m^2*min	<0.010	<0.030	<0.010	<0.010	**0.41**	<0.020
cis-1,2-Dichloroethene	ppbv	<0.13	<0.14	<0.13	<0.13	**2.3**	<0.13
	µg/m^3	<0.52	<0.56	<0.52	<0.52	**9.2**	<0.52
	µg/m^2*min	<0.020	<0.022	<0.020	<0.020	**0.35**	<0.020
Ethanol	ppbv	<1.3	<1.5	<1.2	<1.9	**12**	<0.92
	µg/m^3	<2.4	<2.8	<2.4	<3.6	**23**	<1.8
	µg/m^2*min	<0.092	<0.11	<0.092	<0.14	**0.89**	<0.069
Ethylbenzene	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.57	<0.62	<0.57	<0.57	<0.57	<0.57
	µg/m^2*min	<0.022	<0.024	<0.022	<0.022	<0.022	<0.022
Freon 12	ppbv	<0.13	<0.25	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.65	<1.2	<0.65	<0.65	<0.65	<0.65
	µg/m^2*min	<0.025	<0.046	<0.025	<0.025	<0.025	<0.025
Methyl Tertiary Butyl Ether	ppbv	<0.67	<0.68	<0.67	<0.67	**0.85**	**1.0**
	µg/m^3	<2.4	<2.5	<2.4	<2.4	**3.1**	**3.7**
	µg/m^2*min	<0.092	<0.096	<0.092	<0.092	**0.12**	**0.14**
Methylene Chloride	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.45	<0.49	<0.45	<0.45	<0.45	<0.45
	µg/m^2*min	<0.017	<0.019	<0.017	<0.017	<0.017	<0.017
Toluene	ppbv	<0.18	<1.1	<0.13	<0.13	<0.70	<0.52
	µg/m^3	<0.68	<4.1	<0.49	<0.49	<2.7	<2.0
	µg/m^2*min	<0.026	<0.16	<0.019	<0.019	<0.10	<0.077
Trichloroethene	ppbv	<0.13	<0.14	<0.13	<0.13	**2.8**	<0.13
	µg/m^3	<0.72	<0.77	<0.72	<0.72	**15**	<0.72
	µg/m^2*min	<0.028	<0.030	<0.028	<0.028	**0.59**	<0.028
m,p-Xylene	ppbv	<0.13	<0.28	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.57	<1.2	<0.57	<0.57	<0.57	<0.57
	µg/m^2*min	<0.022	<0.046	<0.022	<0.022	<0.022	<0.022
o-Xylene	ppbv	<0.13	<0.14	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.57	<0.62	<0.57	<0.57	<0.57	<0.57
	µg/m^2*min	<0.022	<0.024	<0.022	<0.022	<0.022	<0.022

TABLE 2-8

OPERABLE UNIT 3 FLUX CHAMBER
ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 2 of 3)

ANALYTE	UNITS	122-S01-089 SG-S01-B26	122-S01-093 SG-S01-B28	122-S01-095 SG-S01-B29	122-S01-099A SG-S01-B31	122-S01-061 SG-S01-B12	122-S01-055 SG-S01-B9
1,2,4-Trimethylbenzene	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	**0.18**
	µg/m³	<0.65	<0.65	<0.65	<0.65	<0.65	**0.92**
	µg/m²*min	<0.025	<0.025	<0.025	<0.025	<0.025	**0.035**
1,3,5-Trimethylbenzene	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
	µg/m²*min	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
1,2-Dichloroethane	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.53	<0.53	<0.53	<0.53	<0.53	<0.53
	µg/m²*min	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
1,4-Dioxane	ppbv	<0.67	**1.4**	**1.9**	<0.67	<0.67	<0.67
	µg/m³	<2.4	**5.2**	**6.9**	<2.4	<2.4	<2.4
	µg/m²*min	<0.092	**0.20**	**0.27**	<0.092	<0.092	<0.092
2-Propanol	ppbv	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67
	µg/m³	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
	µg/m²*min	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062
Acetone	ppbv	<2.4	**7.5**	**6.8**	**5.2**	**9.4**	<1.3
	µg/m³	<5.7	**18**	**16**	**12**	**23**	<3.2
	µg/m²*min	<0.22	**0.70**	**0.63**	**0.48**	**0.88**	<0.12
Carbon Disulfide	ppbv	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67
	µg/m³	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
	µg/m²*min	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081
Carbon Tetrachloride	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.83	<0.83	<0.83	<0.83	<0.83	<0.83
	µg/m²*min	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032
Chlorobenzene	ppbv	<0.13	<0.13	<0.13	**0.23**	<0.13	<0.13
	µg/m³	<0.61	<0.61	<0.61	**1.0**	<0.61	<0.61
	µg/m²*min	<0.023	<0.023	<0.023	**0.041**	<0.023	<0.023
Chloroethane	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
	µg/m²*min	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Chloroform	ppbv	<0.13	<0.13	<0.13	<0.13	**0.34**	<0.13
	µg/m³	<0.65	<0.65	<0.65	<0.65	**1.7**	<0.65
	µg/m²*min	<0.025	<0.025	<0.025	<0.025	**0.066**	<0.025
Chloromethane	ppbv	<0.28	<0.38	<0.67	<0.48	<0.78	<0.33
	µg/m³	<0.58	<0.80	<1.4	<1.0	<1.6	<0.69
	µg/m²*min	<0.022	<0.031	<0.054	<0.038	<0.062	<0.027
cis-1,2-Dichloroethene	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52
	µg/m²*min	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethanol	ppbv	<0.65	<0.65	<2.2	<0.65	**0.74**	**2.4**
	µg/m³	<1.2	<1.2	<4.3	<1.2	**1.4**	**4.5**
	µg/m²*min	<0.046	<0.046	<0.17	<0.046	**0.055**	**0.17**
Ethylbenzene	ppbv	<0.13	<0.13	**0.26**	**0.17**	<0.13	**0.17**
	µg/m³	<0.57	<0.57	**1.1**	**0.76**	<0.57	**0.75**
	µg/m²*min	<0.022	<0.022	**0.044**	**0.029**	<0.022	**0.025**
Freon 12	ppbv	<0.13	<0.36	<0.69	<0.38	**0.26**	<0.46
	µg/m³	<0.65	<1.8	<3.5	<1.9	**1.3**	<2.3
	µg/m²*min	<0.025	<0.069	<0.13	<0.073	**0.050**	<0.088
Methyl Tertiary Butyl Ether	ppbv	<0.67	<0.67	<0.67	<0.67	<0.67	<0.67
	µg/m³	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
	µg/m²*min	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
Methylene Chloride	ppbv	<0.13	<0.13	<0.2	<0.13	**0.13**	<0.22
	µg/m³	<0.45	<0.45	<0.7	<0.47	**0.47**	<0.76
	µg/m²*min	<0.017	<0.017	<0.027	<0.017	**0.018**	<0.029
Toluene	ppbv	<0.38	<0.73	<1.1	<0.67	**0.17**	<1.7
	µg/m³	<1.4	<2.8	<4.3	<2.6	**0.66**	<6.6
	µg/m²*min	<0.054	<0.11	<0.17	<0.10	**0.025**	<0.25
Trichloroethene	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
	µg/m³	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72
	µg/m²*min	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028
m,p-Xylene	ppbv	<0.13	<0.13	<0.28	<0.18	<0.13	<0.61
	µg/m³	<0.57	<0.57	<1.2	<0.82	<0.57	<2.7
	µg/m²*min	<0.022	<0.022	<0.046	<0.022	<0.022	<0.022
o-Xylene	ppbv	<0.13	<0.13	<0.13	<0.13	<0.13	**0.19**
	µg/m³	<0.57	<0.57	<0.57	<0.57	<0.57	**0.82**
	µg/m²*min	<0.022	<0.022	<0.022	<0.022	<0.022	**0.032**

TABLE 2-8

OPERABLE UNIT 3 FLUX CHAMBER
ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 3 of 3)

ANALYTE	UNITS	122-S01-059 SG-S01-B11	122-S01-047 SG-S01-B5	122-S01-049 SG-S01-B6	122-S01-151 SG-S01-B11C
1,2,4-Trimethylbenzene	ppbv	<0.13	<0.13	<0.13	**1.5**
	µg/m^3	<0.65	<0.65	<0.65	**7.4**
	µg/m^2*min	<0.025	<0.025	<0.025	**0.28**
1,3,5-Trimethylbenzene	ppbv	<0.13	<0.13	<0.13	**0.64**
	µg/m^3	<0.65	<0.65	<0.65	**3.2**
	µg/m^2*min	<0.025	<0.025	<0.025	**0.12**
1,2-Dichloroethane	ppbv	**0.61**	<0.13	<0.13	<0.13
	µg/m^3	**2.5**	<0.53	<0.53	<0.53
	µg/m^2*min	**0.10**	<0.020	<0.020	<0.020
1,4-Dioxane	ppbv	**1.4**	**0.88**	<0.67	**1.5**
	µg/m^3	**5.3**	**3.2**	<2.4	**5.4**
	µg/m^2*min	**0.20**	**0.12**	<0.092	**0.21**
2-Propanol	ppbv	<0.67	<0.67	<0.67	<0.67
	µg/m^3	<1.6	<1.6	<1.6	<1.6
	µg/m^2*min	<0.062	<0.062	<0.062	<0.062
Acetone	ppbv	**3.9**	**10**	<1.8	<1.9
	µg/m^3	**9.4**	**25**	<4.3	<4.5
	µg/m^2*min	**0.36**	**0.96**	<0.17	<0.17
Carbon Disulfide	ppbv	<0.67	**0.98**	<0.67	<0.67
	µg/m^3	<2.1	**3.1**	<2.1	<2.1
	µg/m^2*min	<0.081	**0.12**	<0.081	<0.081
Carbon Tetrachloride	ppbv	**0.18**	<0.13	<0.13	<0.13
	µg/m^3	**1.2**	<0.83	<0.83	<0.83
	µg/m^2*min	**0.045**	<0.032	<0.032	<0.032
Chlorobenzene	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.61	<0.61	<0.61	<0.61
	µg/m^2*min	<0.023	<0.023	<0.023	<0.023
Chloroethane	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.35	<0.35	<0.35	<0.35
	µg/m^2*min	<0.013	<0.013	<0.013	<0.013
Chloroform	ppbv	**0.35**	<0.13	<0.13	**0.48**
	µg/m^3	**1.7**	<0.65	<0.65	**2.4**
	µg/m^2*min	**0.067**	<0.025	<0.025	**0.092**
Chloromethane	ppbv	<1.2	<0.35	<0.15	<0.48
	µg/m^3	<2.6	<0.73	<0.32	<1.0
	µg/m^2*min	<0.10	<0.028	<0.012	<0.038
cis-1,2-Dichloroethene	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.52	<0.52	<0.52	<0.52
	µg/m^2*min	<0.020	<0.020	<0.020	<0.020
Ethanol	ppbv	<0.92	<2.0	<0.96	**0.93**
	µg/m^3	<1.8	<3.8	<1.8	**1.8**
	µg/m^2*min	<0.069	<0.15	<0.069	**0.068**
Ethylbenzene	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.57	<0.57	<0.57	<0.57
	µg/m^2*min	<0.022	<0.022	<0.022	<0.022
Freon 12	ppbv	<0.13	<0.40	<0.13	<0.13
	µg/m^3	<0.65	<2.0	<0.65	<0.65
	µg/m^2*min	<0.025	<0.077	<0.025	<0.025
Methyl Tertiary Butyl Ether	ppbv	<0.67	<0.67	<0.67	<0.67
	µg/m^3	<2.4	<2.4	<2.4	<2.4
	µg/m^2*min	<0.092	<0.092	<0.092	<0.092
Methylene Chloride	ppbv	<0.16	<0.15	<0.13	<0.13
	µg/m^3	<0.57	<0.52	<0.45	<0.45
	µg/m^2*min	<0.022	<0.020	<0.017	<0.017
Toluene	ppbv	<0.13	<0.48	<0.14	<0.38
	µg/m^3	<0.49	<1.8	<0.55	<1.4
	µg/m^2*min	<0.019	<0.069	<0.021	<0.054
Trichloroethene	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.72	<0.72	<0.72	<0.72
	µg/m^2*min	<0.028	<0.028	<0.028	<0.028
m,p-Xylene	ppbv	<0.13	<0.13	<0.13	**0.54**
	µg/m^3	<0.57	<0.57	<0.57	**2.4**
	µg/m^2*min	<0.022	<0.022	<0.022	**0.083**
o-Xylene	ppbv	<0.13	<0.13	<0.13	<0.13
	µg/m^3	<0.57	<0.57	<0.57	<0.57
	µg/m^2*min	<0.022	<0.022	<0.022	<0.022

Notes:

Bold indicates positive detection

VOCs that were reported as nondetect in all samples were excluded from this summary.

µg/m3 = Micrograms per cubic meter

SG = Soil gas sample

ppbv = Parts per billion by volume

TABLE 2-9

OPERABLE UNIT 3 FLUX CHAMBER - MAXIMUM CONCENTRATIONS
AND PRELIMINARY REMEDIATION GOALS
ALAMEDA POINT
ALAMEDA, CALIFORNIA
(Page 1 of 1)

ANALYTE	UNITS	Maximum Detected Concentration	Region IX Ambient Air PRG	
			Cancer	Noncancer
1,2,4-Trimethylbenzene	µg/m^3	**7.4**	-	6.2E+00
1,3,5-Trimethylbenzene	µg/m^3	3.2	-	6.2E+00
1,2-Dichloroethane	µg/m^3	**2.5**	7.4E-02	5.1E+00
1,4-Dioxane	µg/m^3	**6.9**	6.1E-01	-
2-Propanol	µg/m^3	38	-	-
Acetone	µg/m^3	100	-	3.7E+02
Carbon Disulfide	µg/m^3	3.1	-	7.3E+02
Carbon Tetrachloride	µg/m^3	**1.2**	1.3E-01	2.6E+00
Chlorobenzene	µg/m^3	1.0	-	6.2E+01
Chloroethane	µg/m^3	1.7	2.3E+00	1.0E+04
Chloroform	µg/m^3	**2.4**	8.4E-02	3.1E-01
Chloromethane	µg/m^3	**11**	1.1E+00	1.9E+09
cis-1,2-Dichloroethene	µg/m^3	9.2	-	3.7E+01
Ethanol	µg/m^3	23	-	-
Ethylbenzene	µg/m^3	1.1	1.1E+03	-
Freon 12	µg/m^3	1.3	-	2.1E+02
Methyl Tertiary Butyl Ether	µg/m^3	3.7	-	3.1E+03
Methylene Chloride	µg/m^3	0.47	4.1E+00	-
Toluene	µg/m^3	0.66	-	4.0E+02
Trichloroethene	µg/m^3	**15**	1.1E+00	2.2E+01
m,p-Xylene	µg/m^3	2.4	-	7.3E+02
o-Xylene	µg/m^3	0.95	-	7.3E+02

Notes:

Bold numbers indicate that the maximum detected concentration is above the Region IX ambient air PRG.

µg/m^3 = Micrograms per cubic meter

PRG = Preliminary remediation goal

MRL (200 µg/L) during follow-up sampling (including one duplicate) of eight on-site wells screened in the FWBZ located near the areas of detection in ambient air (M001-A, M002-A, M003-A, M027-A, M029-A, M033-A, and M034-A). Complete analytical results are presented in Appendix B.

2.3 EXISTING SOIL COVER

Results of the shallow soil borings indicated that existing soil cover is a minimum of 2 feet in thickness throughout landfill areas. The visible upper limit of debris was commonly encountered between 3 and 4 feet bgs and occasionally, as deep as 8 feet bgs. The upper 2 feet of soil at the site consisted of poorly graded sand (SP) and silty sand (SM). The allowable bearing capacity of the existing soil cover ranged between 1,341 and 4,759 pounds per square foot (ASTM Method D-2850, 1997). Direct shear tests for samples collected at GP-S01-B9 and GP-S01-B19 (122-S01-124 and 122-S01-130, respectively) resulted in immeasurable peak cohesion intercept and friction angle during analyses. The ultimate direct-shear test results are used for determination of the allowable bearing capacity, however, because this results in a conservative estimate. Therefore, failure to estimate peak values does not result in loss or degradation of data. Laboratory-determined geotechnical parameters are included in Appendix F, and results are summarized in Table 2-10. This information can be used to assist in design of a potential containment remedy for the OU-3 landfill areas. These results also suggest that sufficient soil cover exists in landfill areas to protect against disturbance or undesired exposure of refuse during construction activities.

TABLE 2-10

OPERABLE UNIT 3 EXISTING SOIL COVER GEOTECHNICAL PROPERTIES
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Sample ID	Location	Grain Size % Pass 200 sieve (fines)	Soil Type	Moisture Content (%)	Dry Density (lb/ft^3)	Direct Shear Test Results				Allowable Bearing Capacity (lb/ft^2)
						Peak		Ultimate		
						C	Degrees	C	Degrees	
122-S01-124	GP-S01-B9	12.3	SM	8.10	105.10	NA	NA	300	24	2,664
122-S01-125	GP-S01-B10	20.9	SM	8.00	114.00	100	33	100	31	2,352
122-S01-126	GP-S01-B12	9.0	SP-SM	6.10	104.20	100	31	100	29	1,823
122-S01-128	GP-S01-B16	13.1	SM	4.60	96.30	50	31	50	30	1,341
122-S01-129	GP-S01-B18	8.8	SP-SM	3.70	117.50	400	32	250	32	4,759
122-S01-130	GP-S01-B19	14.4	SM	5.70	108.80	NA	NA	250	27	2,982
122-S01-132	GP-S01-B23	15.4	SM	11.10	100.00	150	28	100	27	1,502
122-S01-133	GP-S01-B25	14.9	SM	9.00	106.40	200	37	100	37	4,599
122-S01-134	GP-S01-B28	9.4	SP-SM	9.00	101.40	250	28	150	28	2,164
122-S01-135	Duplicate	7.5	SP-SM	4.60	114.30	250	28	100	28	1,701
122-S01-136	Duplicate	8.4	SP-SM	6.70	105.80	200	30	150	29	2,399
122-S01-138	Duplicate	14.0	SM	7.70	114.40	150	30	150	29	2,463

Notes:

Allowable bearing capacity was calculated based on the Terzaghi method, with a safety factor of 4.

SM = Silty sand

SP = Poorly graded sand

lb/ft^3 = Pounds per cubic foot

Degrees = Friction angle

C = Cohesion intercept

% = Percent

lb/ft^3 = Pounds per cubic foot

GP = Geoprobe sample

ID = Identification

NA = Not analyzed

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APPENDIX A

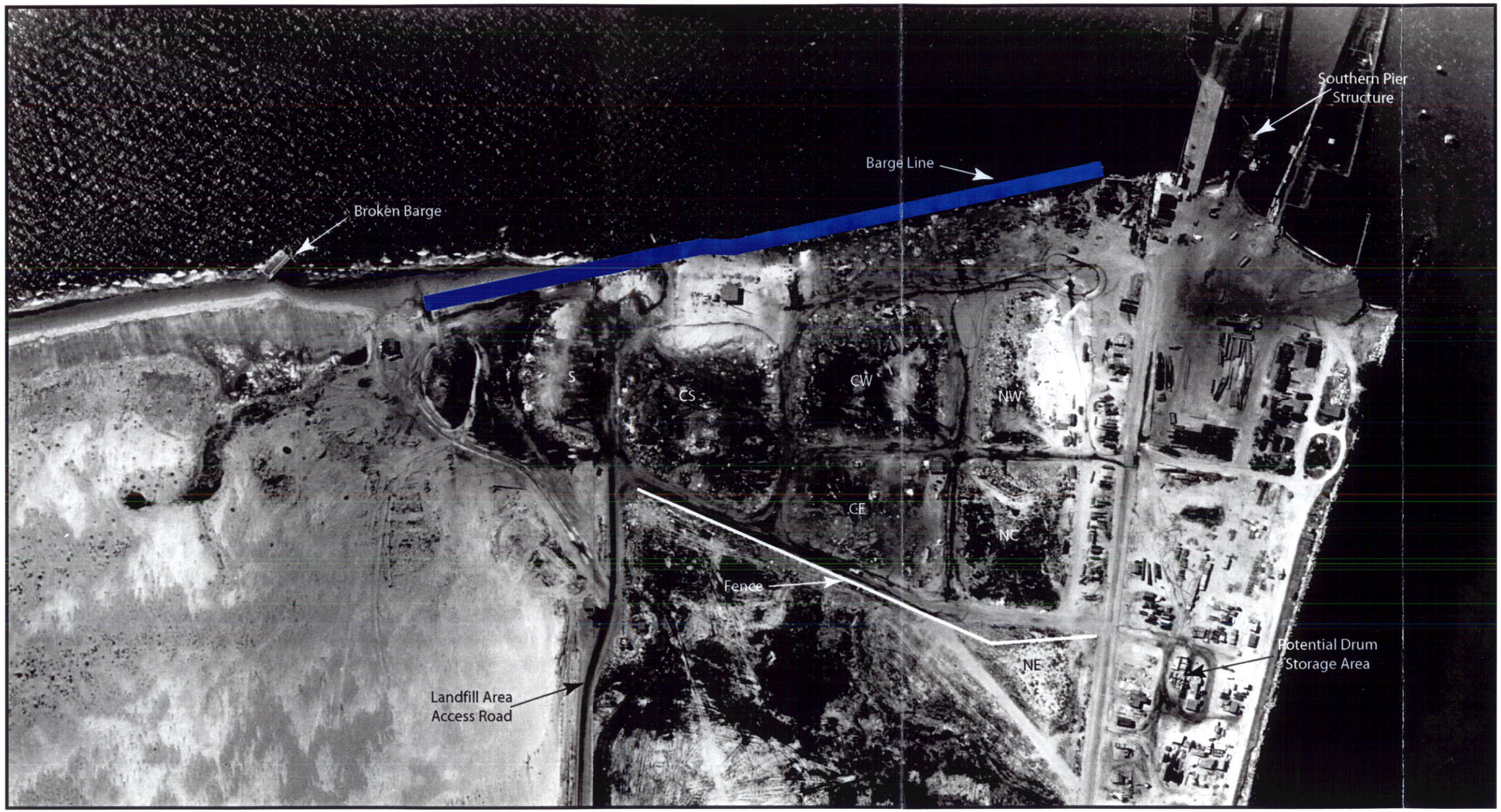


FIGURE A-1
AERIAL PHOTOGRAPH
OPERABLE UNIT 3
ALAMEDA POINT
ALAMEDA, CALIFORNIA

Pacific Aerial Surveys, 1949

DS . 0168.15877

DESCRIPTION OF FIGURE A-1 AERIAL PHOTOGRAPH CIRCA 1949

Area North of Landfill Cells:

The majority of features are railroad rails, railroad ties, pier piling, pier cribbing, and pier decking from active demolition of the old railroad mole and associated berthing piers. Numerous shipping containers (crates) are interspersed among the demolition materials. A small drum storage area appears to be located north of the northeastern (NE) fill cell. Four small buildings (10 by 10 feet to 25 by 25 feet in size) are located adjacent to the southernmost pier. Another building (25 by 25 feet) is located at the northwestern tip of the island.

Landfill Cells:

It appears that the north-south and east-west access roads to the landfill area have been watered or oiled for dust control.

The surface of the northwestern (NW) fill cell shows stacks of railroad rails and ties and pier decking and cribbing. A line of spilled fluid appears to extend along the access road through the cell. The remainder of the cell is covered by low scrub vegetation.

The surface of the north-central (NC) fill cell shows stacks of railroad rails and ties and pier cribbing. The remainder of the cell is covered by low scrub vegetation.

The surface of the NE fill cell does not show any features, except for a north-south trending fenceline for litter control. The remainder of the cell is covered by low scrub vegetation.

The surface of the central-western (CW) fill cell shows active landfilling operations. No scrub vegetation is present. The cell is surrounded by watered or oiled access roads. The main access road to the cell has also been watered or oiled.

The surface of the central-eastern (CE) fill cell shows recent disturbance. Little scrub vegetation has been reestablished. A 25-by-25 foot building is located in the NW corner of the cell. Recent fill and cover activity is evident in southern (S) portion of cell. The cell is surrounded by watered or oiled access roads. A fenceline runs north-south along the eastern edge of the cell.

The surface of the central-southern (CS) fill cell shows recent disturbance. Little scrub vegetation has been reestablished. Recent fill and cover activity is evident in the northern portion of the cell. The cell is surrounded on the northern, southern, and eastern sides by watered or oiled roads. Dredged fill material (sand from the Bay) has obliterated the western edge of the cell.

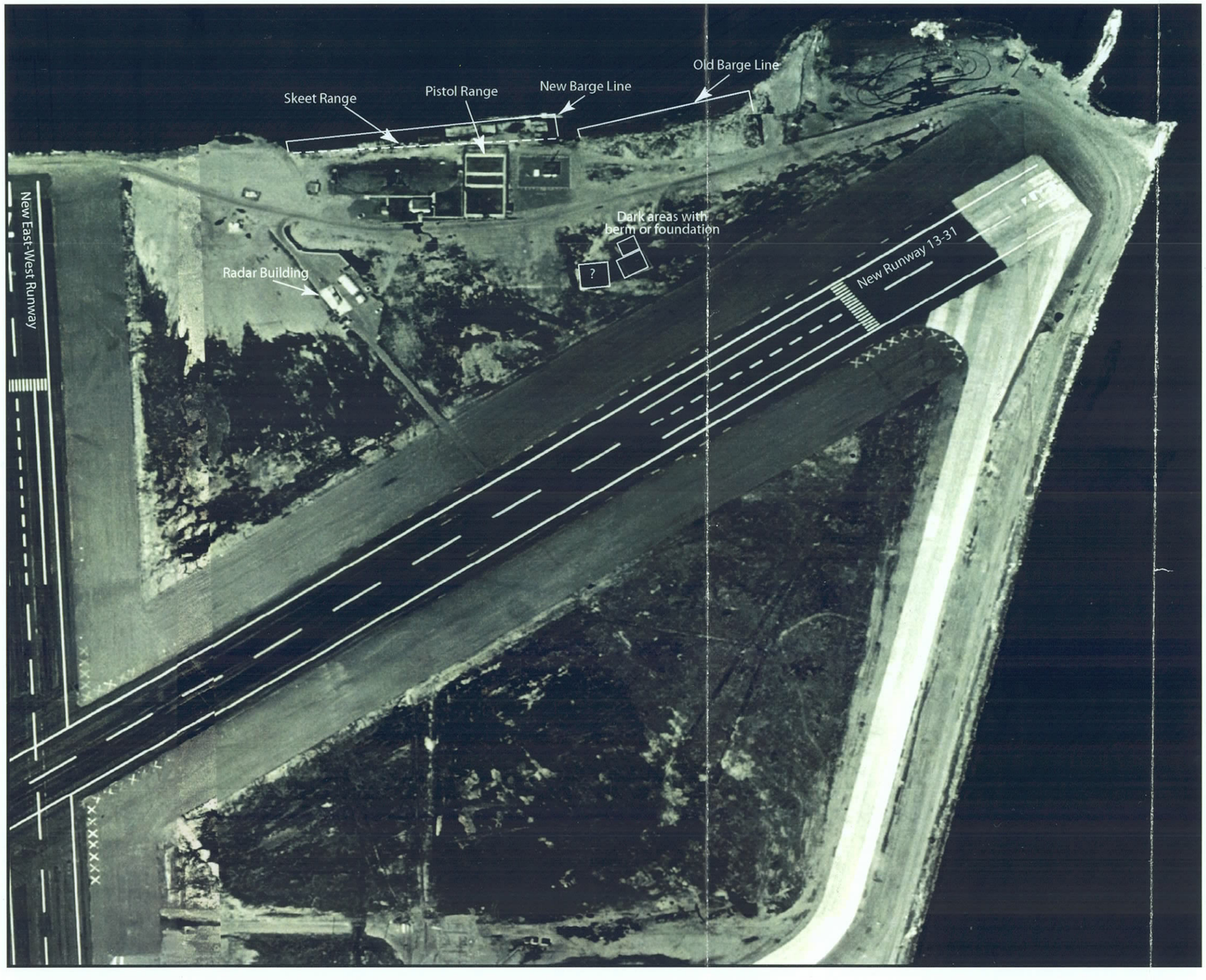
The surface of the southern fill cell shows evidence of older disturbance. Scrub vegetation is returning to disturbed area. Sunken barges protect the cell from wave and beach erosion. Recent dredge fill material (sand from the Bay) covers a large area south of the cell, toward Installation Restoration Site 2. One 25-by-25 foot building is located south of the cell. A cluster of three buildings is located east of the cell along the landfill area access road.

Area West of Landfill Cells:

The area west of the landfill cells has been filled with dredge sand from the Bay. Scrub vegetation is returning to the filled area. A line of sunken barges, used to stabilize the shoreline, is located west of the landfill (blue line), extending from the NW fill cell south to Runway 7-25. A 30-by-30 foot structure with an antenna is present west of the CS fill cell in an area of more recent dredge and fill activity.

Area East of Landfill Cells:

The area east of the landfill cells has been disturbed by historic dredge and fill activity (not landfilling activities). The scrub vegetation has been reestablished on the new dredge fill material surface.



Pacific Aerial Surveys, 1957

FIGURE A-2
AERIAL PHOTOGRAPH
OPERABLE UNIT 3
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DS . 0168.15877

DESCRIPTION OF FIGURE A-2 AERIAL PHOTOGRAPH CIRCA 1957

The landfill area has been closed and covered with a final cover. The old runways have been abandoned and two new runways (13-31 and 7-25) have been constructed. The end of Runway 13-31 (norwest-southeast) extends over the landfill area.

The old piers and railroad lines associated with the old mole have been removed. Additional fill material (dredged from the Bay) has been placed along the western edge of the island, near the old piers and at the end of Runway 7-25 (east-west).

Two dark, square areas (one 45-by-45-foot area and one 50-by-50-foot area) are located between Runway 13-31 and the perimeter road, near the central-western fill cell. A berm is present around each square area. The function of the square areas is unknown.

A firing range and a skeet range have been constructed south of the antenna structure, along the Bay shoreline, west of the perimeter road.

An additional barge line has been added to the Bay shoreline to protect the newly filled area and the firing and skeet ranges from wave and beach erosion.

A radar building has been constructed east of the skeet range on the southern fill cell.

APPENDIX B

CLP SVOA ALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/28/00

TtEMI Sample ID / Units	122-S01-009 (UG/L)			122-S01-010 (UG/L)			122-S01-011 (UG/L)			122-S01-013 (UG/L)			122-S01-014 (UG/L)		
Sample Location	HP-S01-B5-5			HP-S01-B5-15			HP-S01-B6-5			HP-S01-B7-5			HP-S01-B7-15		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		10	U		10	U		11	U		10	U	
1,2-DICHLOROBENZENE	5	U		5	U		5	U		6	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U		5	U		6	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U		5	U		6	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		10	U		10	U		11	U		10	U	
2,4,5-TRICHLOROPHENOL	26	U		25	U		25	U		29	U		25	U	
2,4,6-TRICHLOROPHENOL	10	U		10	U		10	U		11	U		10	U	
2,4-DICHLOROPHENOL	10	U		10	U		10	U		11	U		10	U	
2,4-DIMETHYLPHENOL	10	U		6	J	g	10	U		11	U		10	U	
2,4-DINITROPHENOL	26	UJ	f	25	UJ	f	25	UJ	f	29	UJ	f	25	UJ	f
2,4-DINITROTOLUENE	10	U		10	U		10	U		11	U		10	U	
2,6-DINITROTOLUENE	10	U		10	U		10	U		11	U		10	U	
2-CHLORONAPHTHALENE	10	U		10	U		10	U		11	U		10	U	
2-CHLOROPHENOL	10	U		10	U		10	U		11	U		10	U	
2-METHYLNAPHTHALENE	10	U		10	U		10	U		11	U		10	U	
2-METHYLPHENOL	10	U		10	U		10	U		11	U		10	U	
2-NITROANILINE	26	U		25	U		25	U		29	U		25	U	
2-NITROPHENOL	10	U		10	U		10	U		11	U		10	U	
3,3'-DICHLOROBENZIDINE	10	U		10	U		10	U		11	U		10	U	
3-NITROANILINE	26	U		25	U		25	U		29	U		25	U	
4,6-DINITRO-2-METHYLPHENOL	26	UJ	f	25	UJ	f	25	UJ	f	29	UJ	f	25	UJ	f
4-BROMOPHENYL-PHENYLETHER	10	U		10	U		10	U		11	U		10	U	
4-CHLORO-3-METHYLPHENOL	10	U		10	U		10	U		11	U		10	U	
4-CHLOROANILINE	10	U		10	U		10	U		11	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		10	U		10	U		11	U		10	U	
4-METHYLPHENOL	10	U		10	U		10	U		11	U		10	U	
4-NITROANILINE	26	U		25	U		25	U		29	U		25	U	
4-NITROPHENOL	26	U		25	U		25	U		29	U		25	U	
ACENAPHTHENE	3	J	g	10	U		10	U		11	U		10	U	
ACENAPHTHYLENE	10	U		10	U		10	U		11	U		10	U	
ANTHRACENE	10	U		10	U		10	U		11	U		10	U	
BENZO(A)ANTHRACENE	10	U		10	U		10	U		11	U		10	U	
BENZO(A)PYRENE	10	U		10	U		10	U		11	U		10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-009 (UG/L)			122-S01-010 (UG/L)			122-S01-011 (UG/L)			122-S01-013 (UG/L)			122-S01-014 (UG/L)		
Sample Location	HP-S01-B5-5			HP-S01-B5-15			HP-S01-B6-5			HP-S01-B7-5			HP-S01-B7-15		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		10	U		10	U		11	U		10	U	
BENZO(G,H,I)PERYLENE	10	U		10	U		10	U		11	U		10	U	
BENZO(K)FLUORANTHENE	10	U		10	U		10	U		11	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		10	U		10	U		11	U		10	U	
BIS(2-CHLOROETHYL)ETHER	10	U		10	U		10	U		11	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U		10	U		10	U		11	U		10	U	
BUTYLBENZYLPHTHALATE	10	U		10	U		10	U		11	U		10	U	
CARBAZOLE	10	U		10	U		10	U		11	U		10	U	
CHRYSENE	10	U		10	U		10	U		11	U		10	U	
DI-N-BUTYLPHTHALATE	10	U		10	U		10	U		11	U		10	U	
DI-N-OCTYLPHTHALATE	10	UJ	f	10	UJ	f	10	UJ	f	11	UJ	f	10	UJ	f
DIBENZ(A,H)ANTHRACENE	10	U		10	U		10	U		11	U		10	U	
DIBENZOFURAN	10	U		10	U		10	U		11	U		10	U	
DIETHYLPHTHALATE	10	U		10	U		10	U		11	U		10	U	
DIMETHYLPHTHALATE	10	U		10	U		10	U		11	U		10	U	
FLUORANTHENE	10	U		10	U		10	U		11	U		10	U	
FLUORENE	10	U		10	U		10	U		11	U		10	U	
HEXACHLOROBENZENE	10	U		10	U		10	U		11	U		10	U	
HEXACHLOROBUTADIENE	10	U		10	U		10	U		11	U		10	U	
HEXACHLOROCYCLOPENTADIENE	10	U		10	U		10	U		11	U		10	U	
HEXACHLOROETHANE	10	U		10	U		10	U		11	U		10	U	
INDENO(1,2,3-CD)PYRENE	10	U		10	U		10	U		11	U		10	U	
ISOPHORONE	10	U		10	U		10	U		11	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U		10	U		10	U		11	U		10	U	
N-NITROSODIPHENYLAMINE (1)	10	U		10	U		10	U		11	U		10	U	
NAPHTHALENE	10			10	U		10	U		11	U		10	U	
NITROBENZENE	10	U		10	U		10	U		11	U		10	U	
PENTACHLOROPHENOL	26	U		25	U		25	U		29	U		25	U	
PHENANTHRENE	10	U		10	U		10	U		11	U		10	U	
PHENOL	10	U		10	U		10	U		11	U		10	U	
PYRENE	10	U		10	U		10	U		11	U		10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/28/00

TtEMI Sample ID / Units	122-S01-021 (UG/L)			122-S01-022 (UG/L)			122-S01-023 (UG/L)			122-S01-024 (UG/L)			122-S01-025 (UG/L)		
Sample Location	HP-S01-B10-5			HP-S01-B10-15			HP-S01-B11-5			HP-S01-B11-15			HP-S01-B12-5		
Sample Depth (ft)	4.00 - 6.00			13.00 - 15.00			4.00 - 6.00			13.00 - 15.00			4.00 - 6.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	11	U		10	U		11	U		10	U		10	U	
1,2-DICHLOROBENZENE	6	U		5	U		18			5	U		5	U	
1,3-DICHLOROBENZENE	6	U		5	U		5	U		5	U		5	U	
1,4-DICHLOROBENZENE	6	U		5	U		5	U		5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	11	U		10	U		11	U		10	U		10	U	
2,4,5-TRICHLOROPHENOL	28	U		24	U		27	U		24	U		25	U	
2,4,6-TRICHLOROPHENOL	11	U		10	U		11	U		10	U		10	U	
2,4-DICHLOROPHENOL	11	U		10	U		11	U		10	U		10	U	
2,4-DIMETHYLPHENOL	9	J	g	10	U		14			10	U		10		
2,4-DINITROPHENOL	28	UJ	f	24	UJ	f	27	UJ	f	24	UJ	f	25	UJ	f
2,4-DINITROTOLUENE	11	U		10	U		11	U		10	U		10	U	
2,6-DINITROTOLUENE	11	U		10	U		11	U		10	U		10	U	
2-CHLORONAPHTHALENE	11	U		10	U		11	U		10	U		10	U	
2-CHLOROPHENOL	11	U		10	U		11	U		10	U		10	U	
2-METHYLNAPHTHALENE	5	J	g	10	U		20			10	U		10	U	
2-METHYLPHENOL	11	U		10	U		11	U		10	U		10	U	
2-NITROANILINE	28	U		24	U		27	U		24	U		25	U	
2-NITROPHENOL	11	U		10	U		11	U		10	U		10	U	
3,3'-DICHLOROBENZIDINE	11	U		10	U		11	U		10	U		10	U	
3-NITROANILINE	28	U		24	U		27	U		24	U		25	U	
4,6-DINITRO-2-METHYLPHENOL	28	UJ	f	24	UJ	f	27	UJ	f	24	UJ	f	25	UJ	f
4-BROMOPHENYL-PHENYLETHER	11	U		10	U		11	U		10	U		10	U	
4-CHLORO-3-METHYLPHENOL	11	U		10	U		11	U		10	U		10	U	
4-CHLOROANILINE	11	U		10	U		11	U		10	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	11	U		10	U		11	U		10	U		10	U	
4-METHYLPHENOL	11	U		10	U		11	U		10	U		10	U	
4-NITROANILINE	28	U		24	U		27	U		24	U		25	U	
4-NITROPHENOL	28	U		24	U		27	U		24	U		25	U	
ACENAPHTHENE	11	U		10	U		3	J	g	10	U		10	U	
ACENAPHTHYLENE	11	U		10	U		11	U		10	U		10	U	
ANTHRACENE	11	U		10	U		11	U		10	U		10	U	
BENZO(A)ANTHRACENE	11	U		10	U		11	U		10	U		10	U	
BENZO(A)PYRENE	11	U		10	U		11	U		10	U		10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-021 (UG/L)			122-S01-022 (UG/L)			122-S01-023 (UG/L)			122-S01-024 (UG/L)			122-S01-025 (UG/L)		
Sample Location	HP-S01-B10-5			HP-S01-B10-15			HP-S01-B11-5			HP-S01-B11-15			HP-S01-B12-5		
Sample Depth (ft)	4.00 - 6.00			13.00 - 15.00			4.00 - 6.00			13.00 - 15.00			4.00 - 6.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	11	U		10	U		11	U		10	U		10	U	
BENZO(G,H,I)PERYLENE	11	U		10	U		11	U		10	U		10	U	
BENZO(K)FLUORANTHENE	11	U		10	U		11	U		10	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	11	U		10	U		11	U		10	U		10	U	
BIS(2-CHLOROETHYL)ETHER	11	U		10	U		11	U		10	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	11	U		48	UJ	b	11	U		10	U		10	U	
BUTYLBENZYLPHTHALATE	11	U		10	U		11	U		10	U		10	U	
CARBAZOLE	11	U		10	U		11	U		10	U		10	U	
CHRYSENE	11	U		10	U		11	U		10	U		10	U	
DI-N-BUTYLPHTHALATE	11	U		10	U		11	U		10	U		10	U	
DI-N-OCTYLPHTHALATE	11	UJ	f	10	UJ	f	11	UJ	f	10	UJ	f	10	UJ	f
DIBENZ(A,H)ANTHRACENE	11	U		10	U		11	U		10	U		10	U	
DIBENZOFURAN	11	U		10	U		11	U		10	U		10	U	
DIETHYLPHTHALATE	11	U		10	U		11	U		10	U		10	U	
DIMETHYLPHTHALATE	11	U		10	U		11	U		10	U		10	U	
FLUORANTHENE	11	U		10	U		11	U		10	U		10	U	
FLUORENE	11	U		10	U		11	U		10	U		10	U	
HEXACHLOROBENZENE	11	U		10	U		11	U		10	U		10	U	
HEXACHLOROBUTADIENE	11	U		10	U		11	U		10	U		10	U	
HEXACHLOROCYCLOPENTADIENE	11	U		10	U		11	U		10	U		10	U	
HEXACHLOROETHANE	11	U		10	U		11	U		10	U		10	U	
INDENO(1,2,3-CD)PYRENE	11	U		10	U		11	U		10	U		10	U	
ISOPHORONE	11	U		10	U		11	U		10	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	11	U		10	U		11	U		10	U		10	U	
N-NITROSODIPHENYLAMINE (1)	3	J	g	10	U		11	U		10	U		10	U	
NAPHTHALENE	14			10	U		63			10	U		10	U	
NITROBENZENE	11	U		10	U		11	U		10	U		10	U	
PENTACHLOROPHENOL	28	U		24	U		27	U		24	U		25	U	
PHENANTHRENE	11	U		10	U		11	U		10	U		10	U	
PHENOL	11	U		10	U		11	U		10	U		10	U	
PYRENE	11	U		10	U		11	U		10	U		10	U	

Validity (Val):
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-026 (UG/L)			122-S01-027 (UG/L)		
Sample Location	HP-S01-B12-15			HP-S01-B11-15		
Sample Depth (ft)	13.00 - 15.00			13.00 - 15.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		10	U	
1,2-DICHLOROBENZENE	5	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		10	U	
2,4,5-TRICHLOROPHENOL	24	U		24	U	
2,4,6-TRICHLOROPHENOL	10	U		10	U	
2,4-DICHLOROPHENOL	10	U		10	U	
2,4-DIMETHYLPHENOL	10	U		10	U	
2,4-DINITROPHENOL	24	UJ	f	24	UJ	f
2,4-DINITROTOLUENE	10	U		10	U	
2,6-DINITROTOLUENE	10	U		10	U	
2-CHLORONAPHTHALENE	10	U		10	U	
2-CHLOROPHENOL	10	U		10	U	
2-METHYLNAPHTHALENE	10	U		10	U	
2-METHYLPHENOL	10	U		10	U	
2-NITROANILINE	24	U		24	U	
2-NITROPHENOL	10	U		10	U	
3,3'-DICHLOROBENZIDINE	10	U		10	U	
3-NITROANILINE	24	U		24	U	
4,6-DINITRO-2-METHYLPHENOL	24	UJ	f	24	UJ	f
4-BROMOPHENYL-PHENYLETHER	10	U		10	U	
4-CHLORO-3-METHYLPHENOL	10	U		10	U	
4-CHLOROANILINE	10	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		10	U	
4-METHYLPHENOL	10	U		10	U	
4-NITROANILINE	24	U		24	U	
4-NITROPHENOL	24	U		24	U	
ACENAPHTHENE	10	U		10	U	
ACENAPHTHYLENE	10	U		10	U	
ANTHRACENE	10	U		10	U	
BENZO(A)ANTHRACENE	10	U		10	U	
BENZO(A)PYRENE	10	U		10	U	

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a - Surrogate recovery problem
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e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-026 (UG/L)			122-S01-027 (UG/L)		
Sample Location	HP-S01-B12-15			HP-S01-B11-15		
Sample Depth (ft)	13.00 - 15.00			13.00 - 15.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01		
Date Extracted / Analyzed	12/09/99 12/14/99			12/09/99 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		10	U	
BENZO(G,H,I)PERYLENE	10	U		10	U	
BENZO(K)FLUORANTHENE	10	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		10	U	
BIS(2-CHLOROETHYL)ETHER	10	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U		10	U	
BUTYLBENZYLPHTHALATE	10	U		10	U	
CARBAZOLE	10	U		10	U	
CHRYSENE	10	U		10	U	
DI-N-BUTYLPHTHALATE	10	U		10	U	
DI-N-OCTYLPHTHALATE	10	UJ	f	10	UJ	f
DIBENZ(A,H)ANTHRACENE	10	U		10	U	
DIBENZOFURAN	10	U		10	U	
DIETHYLPHTHALATE	10	U		10	U	
DIMETHYLPHTHALATE	10	U		10	U	
FLUORANTHENE	10	U		10	U	
FLUORENE	10	U		10	U	
HEXACHLOROBENZENE	10	U		10	U	
HEXACHLOROBUTADIENE	10	U		10	U	
HEXACHLOROCYCLOPENTADIENE	10	U		10	U	
HEXACHLOROETHANE	10	U		10	U	
INDENO(1,2,3-CD)PYRENE	10	U		10	U	
ISOPHORONE	10	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U		10	U	
N-NITROSODIPHENYLAMINE (1)	10	U		10	U	
NAPHTHALENE	10	U		10	U	
NITROBENZENE	10	U		10	U	
PENTACHLOROPHENOL	24	U		24	U	
PHENANTHRENE	10	U		10	U	
PHENOL	10	U		10	U	
PYRENE	10	U		10	U	

Validity (Val):
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Applicable Comments (Com):
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d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-009 (UG/L)			122-S01-010 (UG/L)			122-S01-011 (UG/L)			122-S01-013 (UG/L)			122-S01-014 (UG/L)		
Sample Location	HP-S01-B5-5			HP-S01-B5-15			HP-S01-B6-5			HP-S01-B7-5			HP-S01-B7-15		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Analyzed	12/11/99			12/13/19			12/11/99			12/13/19			12/11/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	UJ	f	10	U		10	UJ	f	10	U	
BENZENE	10	U		16			10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	10	U		6	J	g	10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		23			10	U		10	U		10	U	

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c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-021 (UG/L)			122-S01-022 (UG/L)			122-S01-023 (UG/L)			122-S01-024 (UG/L)			122-S01-025 (UG/L)		
Sample Location	HP-S01-B10-5			HP-S01-B10-15			HP-S01-B11-5			HP-S01-B11-15			HP-S01-B12-5		
Sample Depth (ft)	4.00 - 6.00			13.00 - 15.00			4.00 - 6.00			13.00 - 15.00			4.00 - 6.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Analyzed	12/10/19			12/10/19			12/10/19			12/14/99			12/10/19		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		6	J	g	16			23			6	J	g
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	U		10	U		10	U		10	U	
BENZENE	17			10	U		15			10	U		8	J	g
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	5	J	g	10	U		120			10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	6	J	g	10	U		64			10	U		4	J	g
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U		9	J	g	10	U	
VINYL CHLORIDE	10	U		10	U		26			10	U		10	U	
XYLENE (TOTAL)	13			10	U		400			10	U		8	J	g

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f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-026 (UG/L)			122-S01-027 (UG/L)			122-S01-110 (UG/L)		
Sample Location	HP-S01-B12-15			HP-S01-B11-15			TRIP BLANK		
Sample Depth (ft)	13.00 - 15.00			13.00 - 15.00			0.00 - 0.00		
Date Sampled / SDG Number	12/07/99 ACW01			12/07/99 ACW01			12/07/99 ACW01		
Date Analyzed	12/10/19			12/13/19			12/13/19		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		64			10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U	
ACETONE	10	U		10	UJ	f	10	UJ	f
BENZENE	10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U	

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Note :

SEMIVOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:19

Matrix : WATER

TtEMI Sample ID / Units	122-S01-009 (UG/L)				TtEMI Sample ID / Units	122-S01-010 (UG/L)				TtEMI Sample ID / Units	122-S01-011 (UG/L)			
Sample Location	HP-S01-B5-5				Sample Location	HP-S01-B5-15				Sample Location	HP-S01-B6-5			
Lab Sample ID / SDG Number	9912G116-011 ACW01				Lab Sample ID / SDG Number	9912G116-012 ACW01				Lab Sample ID / SDG Number	9912G116-010 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Extracted	12/09/99				Date Extracted	12/09/99				Date Extracted	12/09/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN KETONE	7	5.44	J		UNKNOWN ALCOHOL	2	4.72	J		UNKNOWN ALCOHOL	3	4.72	J	
UNKNOWN KETONE	2	5.89	J		SUBST. BENZENE	4	4.92	J		UNKNOWN ALCOHOL	2	4.92	J	
UNKNOWN	14	9.06	J		UNKNOWN KETONE	23	5.44	J		UNKNOWN ACID	13	6.98	J	
UNKNOWN	4	11.59	J		SUBST. PHENOL	4	5.54	J		SUBST. BENZOIC ACID	10	8.91	J	
SULFUR	51	13.72	JN		UNKNOWN KETONE	14	5.90	J		UNKNOWN ACID	7	18.15	J	
UNKNOWN	2	16.43	J		SUBST. BENZENE	4	5.93	J						
UNKNOWN PHTHALATE	2	18.10	J		SUBST. PHENOL	7	5.96	J						
UNKNOWN PHTHALATE	5	18.14	J		SUBST. PHENOL	2	6.05	J						
UNKNOWN PHTHALATE	2	18.34	J		SUBST. PHENOL	2	6.29	J						
UNKNOWN	3	18.70	J		SUBST. PHENOL	2	6.52	J						
UNKNOWN PHTHALATE	3	18.75	J		UNKNOWN	2	7.59	J						
UNKNOWN PHTHALATE	2	19.06	J		SUBST. PHENOL	2	7.88	J						
					CHLORINATED BENZOIC ACID	8	8.91	J						
					SUBST. BENZENE	7	9.06	J						
					UNKNOWN	2	9.64	J						
					UNKNOWN ACID	3	10.56	J						
					UNKNOWN	2	11.22	J						
					SULFUR, MOL. (S8)	17	13.70	JN						
					UNKNOWN PHTHALATE	3	16.32	J						
					UNKNOWN PHTHALATE	5	16.36	J						
					UNKNOWN PHTHALATE	14	16.45	J						
					UNKNOWN PHTHALATE	4	18.14	J						
					UNKNOWN PHTHALATE	3	18.47	J						

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c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:19

Matrix : WATER

TtEMI Sample ID / Units	122-S01-013 (UG/L)				TtEMI Sample ID / Units	122-S01-014 (UG/L)				TtEMI Sample ID / Units	122-S01-021 (UG/L)			
Sample Location	HP-S01-B7-5				Sample Location	HP-S01-B7-15				Sample Location	HP-S01-B10-5			
Lab Sample ID / SDG Number	9912G116-008 ACW01				Lab Sample ID / SDG Number	9912G116-009 ACW01				Lab Sample ID / SDG Number	9912G116-001 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Extracted	12/09/99				Date Extracted	12/09/99				Date Extracted	12/09/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
SUBST. BENZOIC ACID	4	8.90	J		UNKNOWN	16	9.06	J		UNKNOWN ALCOHOL	8	2.74	J	
SUBST. BENZENE	10	9.06	J		UNKNOWN	4	11.59	J		UNKNOWN	11	2.90	J	
UNKNOWN	3	11.59	J		SULFUR	55	13.72	JN		UNKNOWN	6	3.12	J	
SULFUR	35	13.70	JN		UNKNOWN	4	15.18	J		UNKNOWN	28	3.43	J	
UNKNOWN PHTHALATE	2	15.77	J		UNKNOWN PHTHALATE	2	16.03	J		UNKNOWN ALCOHOL	18	3.71	J	
UNKNOWN PHTHALATE	3	15.88	J		UNKNOWN PHTHALATE	2	16.24	J		UNKNOWN	6	3.85	J	
UNKNOWN PHTHALATE	4	15.94	J		UNKNOWN PHTHALATE	3	16.32	J		UNKNOWN ALCOHOL	11	4.01	J	
UNKNOWN PHTHALATE	2	16.04	J		UNKNOWN PHTHALATE	6	16.37	J		UNKNOWN ACID	7	4.15	J	
UNKNOWN PHTHALATE	3	16.11	J		UNKNOWN PHTHALATE	4	16.40	J		TRIMETHYLBENZENE ISOMER	5	4.67	J	
UNKNOWN PHTHALATE	4	16.19	J		UNKNOWN PHTHALATE	4	16.45	J		TRIMETHYLBENZENE ISOMER	22	4.92	J	
UNKNOWN PHTHALATE	4	16.24	J		UNKNOWN PHTHALATE	5	16.50	J		SUBSTITUTED NAPTHALENE	9	5.18	J	
UNKNOWN PHTHALATE	6	16.31	J							UNKNOWN	13	5.50	J	
UNKNOWN PHTHALATE	12	16.36	J							DIMETHYLBENZENE ISOMER	8	5.63	J	
UNKNOWN PHTHALATE	12	16.42	J							UNKNOWN KETONE	11	5.90	J	
UNKNOWN PHTHALATE	5	16.50	J							TETRAMETHYLBENZENE ISOMER	13	5.93	J	
UNKNOWN PHTHALATE	6	18.14	J							DIMETHYLPHENOL ISOMER	6	5.97	J	
UNKNOWN PHTHALATE	3	18.36	J							SUBST. NAPHTHALENE	13	6.02	J	
UNKNOWN PHTHALATE	3	18.70	J							SUBST. PHENOL	17	6.15	J	
UNKNOWN PHTHALATE	4	18.75	J							UNKNOWN	10	6.38	J	
UNKNOWN PHTHALATE	4	18.84	J							SUBST. PHENOL	21	6.52	J	
UNKNOWN PHTHALATE	4	18.90	J							UNKNOWN	8	6.87	J	
										SUBST. PHENOL	12	6.99	J	
										NAPHTHALENE, 1-METHYL-	6	7.28	JN	
										UNKNOWN ACID	8	7.41	J	
										SUBST. BENZOIC ACID	10	7.47	J	
										SUBST. BENZOIC ACID	12	7.65	J	
										SUBST. BENZOIC ACID	11	8.08	J	
										UNKNOWN	15	8.12	J	
										SULFUR, MOL. (S8)	15	13.70	JN	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

SEMIVOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:19

Matrix : WATER

TtEMI Sample ID / Units	122-S01-022 (UG/L)				TtEMI Sample ID / Units	122-S01-023 (UG/L)				TtEMI Sample ID / Units	122-S01-024 (UG/L)			
Sample Location	HP-S01-B10-15				Sample Location	HP-S01-B11-5				Sample Location	HP-S01-B11-15			
Lab Sample ID / SDG Number	9912G116-002 ACW01				Lab Sample ID / SDG Number	9912G116-003 ACW01				Lab Sample ID / SDG Number	9912G116-004 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Extracted	12/09/99				Date Extracted	12/09/99				Date Extracted	12/09/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN	2	4.36	J		SUBSTITUTED BENZENE	93	3.40	J		SULFUR, MOL. (S8)	4	13.70	JN	
SUBST. BENZOIC ACID	6	8.91	J		SUBST. BENZENE	11	4.06	J						
UNKNOWN PHTHALATE	2	15.02	J		SUBST. BENZENE	13	4.33	J						
UNKNOWN PHTHALATE	4	15.25	J		SUBST. BENZENE	24	4.40	J						
UNKNOWN PHTHALATE	2	15.38	J		TRIMETHYLBENZENE ISOMER	16	4.45	J						
UNKNOWN PHTHALATE	5	15.43	J		SUBST. BENZENE	28	4.56	J						
UNKNOWN PHTHALATE	4	15.65	J		TRIMETHYLBENZENE ISOMER	55	4.91	J						
UNKNOWN PHTHALATE	3	16.36	J		SUBST. BENZENE	13	5.12	J						
UNKNOWN PHTHALATE	3	16.41	J		UNKNOWN	17	5.17	J						
					UNKNOWN	62	5.43	J						
					SUBST. BENZENE	19	5.93	J						
					UNKNOWN ALCOHOL	7	7.01	J						
					NAPHTHALENE, 1-METHYL-	10	7.28	JN						
					SUBST. BENZOIC ACID	13	7.64	J						
					SUBST. PHENOL	9	7.87	J						
					DIMETHYLNAPHTHALENE ISOMER	9	8.21	J						
					UNKNOWN	8	8.58	J						
					UNKNOWN PNA	13	12.99	J						
					UNKNOWN ALCOHOL	17	13.21	J						
					UNKNOWN	11	13.30	J						
					UNKNOWN	23	13.55	J						
					SUBST. PHENOL	10	14.50	J						
					UNKNOWN ALDEHYDE	11	15.03	J						
					UNKNOWN	23	15.28	J						
					UNKNOWN PNA	68	15.37	J						
					UNKNOWN	14	15.58	J						
					SUBST. PHENOL	58	15.64	J						
					UNKNOWN	30	15.78	J						

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:20

Matrix : WATER

TtEMI Sample ID / Units	122-S01-025 (UG/L)				TtEMI Sample ID / Units	122-S01-026 (UG/L)				TtEMI Sample ID / Units	122-S01-027 (UG/L)			
Sample Location	HP-S01-B12-5				Sample Location	HP-S01-B12-15				Sample Location	HP-S01-B11-15			
Lab Sample ID / SDG Number	9912G116-006 ACW01				Lab Sample ID / SDG Number	9912G116-007 ACW01				Lab Sample ID / SDG Number	9912G116-005 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Extracted	12/09/99				Date Extracted	12/09/99				Date Extracted	12/09/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
SUBST. BENZENE	3	3.70	J		UNKNOWN ALCOHOL	3	4.92	J		UNKNOWN ALCOHOL	24	3.58	J	
SUBST. BENZENE	5	4.05	J		UNKNOWN ALKENE	2	5.20	J		SULFUR, MOL. (S8)	5	13.70	JN	
SUBST. BENZENE	4	4.32	J		UNKNOWN KETONE	3	5.55	J		UNKNOWN PHTHALATE	2	16.32	J	
UNKNOWN ALKENE	6	4.35	J		SULFUR, MOL. (S8)	2	13.69	JN		UNKNOWN PHTHALATE	5	16.37	J	
SUBST. BENZENE	9	4.40	J		UNKNOWN	2	13.80	J		UNKNOWN PHTHALATE	5	16.44	J	
SUBST. BENZENE	6	4.46	J		UNKNOWN PHTHALATE	3	15.88	J		UNKNOWN PHTHALATE	4	16.50	J	
SUBST. BENZENE	8	4.56	J		UNKNOWN PHTHALATE	2	15.94	J						
TRIMETHYLBENZENE ISOMER	20	4.67	J		UNKNOWN PHTHALATE	2	16.19	J						
SUBST. BENZENE	16	4.92	J		UNKNOWN PHTHALATE	3	16.24	J						
SUBST. BENZENE	9	5.17	J		UNKNOWN PHTHALATE	4	16.32	J						
SUBST. BENZENE	4	5.34	J		UNKNOWN PHTHALATE	9	16.36	J						
SUBST. BENZENE	5	5.93	J		UNKNOWN PHTHALATE	8	16.41	J						
SUBST. PHENOL	4	6.52	J		UNKNOWN PHTHALATE	4	16.50	J						
SUBST. PHENOL	6	6.68	J		UNKNOWN KETONE	2	18.02	J						
UNKNOWN	4	7.53	J		UNKNOWN PHTHALATE	4	18.14	J						
SUBST. PHENOL	7	7.87	J		UNKNOWN PHTHALATE	3	18.35	J						
CHLORINATED BENZOIC ACID	5	8.92	J		UNKNOWN	3	19.05	J						
UNKNOWN	10	9.06	J											
UNKNOWN	3	11.59	J											
SULFUR	30	13.71	JN											
SUBST. BENZENE	7	14.02	J											
UNKNOWN PHTHALATE	5	16.32	J											
UNKNOWN PHTHALATE	8	16.36	J											
UNKNOWN	6	16.41	J											
UNKNOWN PHTHALATE	6	16.44	J											
UNKNOWN PHTHALATE	6	16.50	J											
UNKNOWN PHTHALATE	4	18.02	J											
UNKNOWN PHTHALATE	10	18.15	J											
UNKNOWN PHTHALATE	6	18.47	J											

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:20

Matrix : WATER

TtEMI Sample ID / Units	122-S01-011 (UG/L)				TtEMI Sample ID / Units	122-S01-013 (UG/L)				TtEMI Sample ID / Units	122-S01-021 (UG/L)			
Sample Location	HP-S01-B6-5				Sample Location	HP-S01-B7-5				Sample Location	HP-S01-B10-5			
Lab Sample ID / SDG Number	9912G116-010 ACW01				Lab Sample ID / SDG Number	9912G116-008 ACW01				Lab Sample ID / SDG Number	9912G116-001 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Analyzed	12/11/99				Date Analyzed	12/13/19				Date Analyzed	12/10/19			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN SILANOL	24	15.73	J		UNKNOWN ALKANE	12	11.38	J		UNKNOWN CYCLOALKANE	18	17.52	J	
										UNKNOWN CYCLOALKANE	51	18.69	J	
										UNKNOWN CYCLOALKANE	10	22.38	J	
										UNKNOWN	10	25.15	J	
										UNKNOWN ALKENE	17	25.28	J	
										SUBST. BENZENE	20	25.58	J	
										UNKNOWN ALKENE	19	26.30	J	
										SUBST. BENZENE	19	26.51	J	
										UNKNOWN CYCLOALKANE	16	26.80	J	
										SUBST. BENZENE	14	27.39	J	
										UNKNOWN CYCLOALKENE	14	27.75	J	
										SUBST. BENZENE	19	28.14	J	
										UNKNOWN CYCLOHEXANOL	17	28.27	J	
										SUBST. BENZENE	49	28.75	J	
										UNKNOWN	19	29.22	J	
										SUBSTITUTED NAPTHALENE	22	29.42	J	
										UNKNOWN	26	30.58	J	
										SUBST. BENZENE	10	32.44	J	
										SUBSTITUTED NAPTHALENE	13	34.30	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:48:20

Matrix : WATER

TtEMI Sample ID / Units	122-S01-023 (UG/L)				TtEMI Sample ID / Units	122-S01-025 (UG/L)				TtEMI Sample ID / Units	122-S01-026 (UG/L)			
Sample Location	HP-S01-B11-5				Sample Location	HP-S01-B12-5				Sample Location	HP-S01-B12-15			
Lab Sample ID / SDG Number	9912G116-003 ACW01				Lab Sample ID / SDG Number	9912G116-006 ACW01				Lab Sample ID / SDG Number	9912G116-007 ACW01			
Date Sampled	12/07/99				Date Sampled	12/07/99				Date Sampled	12/07/99			
Date Analyzed	12/10/19				Date Analyzed	12/10/19				Date Analyzed	12/10/19			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN ALKANE	72	11.01	J		UNKNOWN CYCLOALKANE	16	18.69	J		UNKNOWN CYCLOALKANE	32	23.85	J	
UNKNOWN ALKANE	95	13.63	J		UNKNOWN ALKENE	11	25.28	J		UNKNOWN ALKANE	32	24.25	J	
UNKNOWN ALKANE	77	15.49	J		UNKNOWN ALKANE	11	26.30	J		UNKNOWN CYCLOALKANE	26	24.55	J	
UNKNOWN CYCLOALKANE	83	15.64	J		UNKNOWN ALKANE	33	26.87	J		UNKNOWN CYCLOALKANE	22	25.10	J	
UNKNOWN ALKANE	190	16.78	J		SUBST. BENZENE	14	27.38	J		UNKNOWN ALKANE	33	25.39	J	
UNKNOWN CYCLOALKANE	180	18.69	J		SUBST. BENZENE	25	27.76	J		UNKNOWN	12	25.74	J	
UNKNOWN ALKANE	170	19.39	J		SUBST. BENZENE	11	28.14	J		UNKNOWN	48	26.61	J	
UNKNOWN ALKANE	220	19.63	J		SUBST. BENZENE	18	28.74	J		UNKNOWN CYCLOALKANE	19	26.86	J	
UNKNOWN ALKANE	120	20.30	J		SUBST. BENZENE	12	29.23	J		UNKNOWN	22	27.15	J	
UNKNOWN CYCLOALKANE	66	26.30	J		SUBST. BENZENE	16	29.40	J		UNKNOWN ALKENE	29	27.56	J	
SUBST. BENZENE	66	26.51	J		SUBST. BENZENE	19	30.59	J		UNKNOWN	30	27.71	J	
SUBST. BENZENE	160	26.75	J							UNKNOWN	23	28.08	J	
SUBST. BENZENE	110	26.90	J							UNKNOWN CYCLOALKANE	19	28.37	J	
SUBST. BENZENE	110	27.38	J							UNKNOWN	17	28.59	J	
UNKNOWN ALKANE	84	27.55	J							UNKNOWN ALKENE	41	28.94	J	
SUBST. BENZENE	280	27.77	J							UNKNOWN	22	29.21	J	
UNKNOWN CYCLOALKANE	78	28.15	J							UNKNOWN	68	29.47	J	
UNKNOWN CYCLOALKANE	68	28.28	J							UNKNOWN CYCLOALKANE	78	29.84	J	
SUBST. BENZENE	150	28.76	J							UNKNOWN	11	30.48	J	
UNKNOWN ALKENE	62	28.91	J							UNKNOWN	22	30.67	J	
SUBST. BENZENE	200	29.23	J											
SUBST. BENZENE	94	29.41	J											
SUBST. BENZENE	69	29.84	J											
SUBST. BENZENE	98	30.13	J											
SUBST. BENZENE	59	30.31	J											
SUBST. BENZENE	160	30.59	J											
SUBST. BENZENE	80	31.39	J											
SUBST. BENZENE	210	32.46	J											
SUBSTITUTED NAPTHALENE	67	32.93	J											
SUBSTITUTED NAPTHALENE	75	34.32	J											

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-003 (UG/L)			122-S01-004 (UG/L)			122-S01-005 (UG/L)			122-S01-006 (UG/L)			122-S01-007 (UG/L)		
Sample Location	HP-S01-B2-5			HP-S01-B2-15			HP-S01-B3-5			HP-S01-B3-15			HP-S01-B4-5		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			8.00 - 10.00			13.00 - 15.00			6.00 - 8.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/28/99			12/15/99 12/28/99			12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		11	U		11	U		10	U		10	U	
1,2-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		11	U		11	U		10	U		10	U	
2,4,5-TRICHLOROPHENOL	24	U		26	U		27	U		26	U		24	U	
2,4,6-TRICHLOROPHENOL	10	U		11	U		11	U		10	U		10	U	
2,4-DICHLOROPHENOL	10	U		11	U		11	U		10	U		10	U	
2,4-DIMETHYLPHENOL	10	UJ	f	11	UJ	f	11	UJ	f	10	UJ	f	10	UJ	f
2,4-DINITROPHENOL	24	UJ	f	26	UJ	f	27	UJ	f	26	UJ	f	24	UJ	f
2,4-DINITROTOLUENE	10	U		11	U		11	U		10	U		10	U	
2,6-DINITROTOLUENE	10	U		11	U		11	U		10	U		10	U	
2-CHLORONAPHTHALENE	10	U		11	U		11	U		10	U		10	U	
2-CHLOROPHENOL	10	U		11	U		11	U		10	U		10	U	
2-METHYLNAPHTHALENE	10	U		11	U		180			10	U		10	U	
2-METHYLPHENOL	10	U		11	U		11	U		10	U		10	U	
2-NITROANILINE	24	UJ	f	26	UJ	f	27	U		26	U		24	UJ	f
2-NITROPHENOL	10	U		11	U		11	U		10	U		10	U	
3,3'-DICHLOROBENZIDINE	10	U		11	U		11	U		10	U		10	U	
3-NITROANILINE	24	U		26	U		27	U		26	U		24	U	
4,6-DINITRO-2-METHYLPHENOL	24	UJ	f	26	UJ	f	27	UJ	f	26	UJ	f	24	UJ	f
4-BROMOPHENYL-PHENYLETHER	10	U		11	U		11	U		10	U		10	U	
4-CHLORO-3-METHYLPHENOL	10	UJ	f	11	UJ	f	11	UJ	f	10	UJ	f	10	UJ	f
4-CHLOROANILINE	10	U		11	U		11	U		10	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		11	U		11	U		10	U		10	U	
4-METHYLPHENOL	10	U		11	U		11	U		10	U		10	U	
4-NITROANILINE	24	U		26	U		27	U		26	U		24	U	
4-NITROPHENOL	24	UJ	f	26	UJ	f	27	UJ	f	26	UJ	f	24	UJ	f
ACENAPHTHENE	10	U		11	U		160			9	J	g	10	U	
ACENAPHTHYLENE	10	U		11	U		11	U		10	U		10	U	
ANTHRACENE	10	U		11	U		11	J	e,g	10	U		10	U	
BENZO(A)ANTHRACENE	10	U		11	U		11	U		10	U		10	U	
BENZO(A)PYRENE	10	U		11	U		11	U		10	U		10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-003 (UG/L)			122-S01-004 (UG/L)			122-S01-005 (UG/L)			122-S01-006 (UG/L)			122-S01-007 (UG/L)		
Sample Location	HP-S01-B2-5			HP-S01-B2-15			HP-S01-B3-5			HP-S01-B3-15			HP-S01-B4-5		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			8.00 - 10.00			13.00 - 15.00			6.00 - 8.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/28/99			12/15/99 12/28/99			12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		11	U		11	U		10	U		10	U	
BENZO(G,H,I)PERYLENE	10	U		11	U		11	U		10	U		10	U	
BENZO(K)FLUORANTHENE	10	U		11	U		11	U		10	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		11	U		11	U		10	U		10	U	
BIS(2-CHLOROETHYL)ETHER	10	U		11	U		11	U		10	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U		11	U		11	U		66	UJ	b	10	U	
BUTYLBENZYLPHTHALATE	10	U		11	U		11	U		10	U		10	U	
CARBAZOLE	10	U		11	U		10	J	e	10	U		10	U	
CHRYSENE	10	U		11	U		11	U		10	U		10	U	
DI-N-BUTYLPHTHALATE	10	U		11	U		11	U		10	U		10	U	
DI-N-OCTYLPHTHALATE	10	U		11	U		11	U		10	U		10	U	
DIBENZ(A,H)ANTHRACENE	10	U		11	U		11	U		10	U		10	U	
DIBENZOFURAN	10	U		11	U		63	J	e	10	U		10	U	
DIETHYLPHTHALATE	10	U		11	U		11	U		10	U		10	U	
DIMETHYLPHTHALATE	10	U		11	U		11	U		10	U		10	U	
FLUORANTHENE	10	U		11	U		15	J	e	10	U		10	U	
FLUORENE	10	U		11	U		68	J	e	10	U		10	U	
HEXACHLOROBENZENE	10	U		11	U		11	U		10	U		10	U	
HEXACHLOROBUTADIENE	10	U		11	U		11	UJ	f	10	UJ	f	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U		11	U		11	U		10	U		10	U	
HEXACHLOROETHANE	10	U		11	U		11	U		10	U		10	U	
INDENO(1,2,3-CD)PYRENE	10	U		11	U		11	U		10	U		10	U	
ISOPHORONE	10	U		11	U		11	U		10	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	UJ	f	11	UJ	f	11	UJ	f	10	UJ	f	10	UJ	f
N-NITROSODIPHENYLAMINE (1)	10	U		11	U		11	U		10	U		10	U	
NAPHTHALENE	10	U		11	U		780			10	U		10	U	
NITROBENZENE	10	U		11	U		11	U		10	U		10	U	
PENTACHLOROPHENOL	24	U		26	U		27	U		26	U		24	U	
PHENANTHRENE	10	U		11	U		120			10	U		10	U	
PHENOL	10	U		11	U		11	U		10	U		10	U	
PYRENE	10	U		11	U		11			10	U		10	U	

Validity (Val):
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
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g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

CLP SVOA LYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/28/00

TtEMI Sample ID / Units	122-S01-008 (UG/L)			122-S01-015 (UG/L)			122-S01-016 (UG/L)			122-S01-017 (UG/L)			122-S01-018 (UG/L)		
Sample Location	HP-S01-B4-15			HP-S01-B8-5			HP-S01-B8-15			HP-S01-B9-5			HP-S01-B9-15		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/28/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		10	U		10	U		10	U		10	U	
2,4,5-TRICHLOROPHENOL	24	U		26	U		24	U		25	U		24	U	
2,4,6-TRICHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2,4-DICHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2,4-DIMETHYLPHENOL	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
2,4-DINITROPHENOL	24	UJ	f	26	UJ	f	24	UJ	f	25	UJ	f	24	UJ	f
2,4-DINITROTOLUENE	10	U		10	U		10	U		10	U		10	U	
2,6-DINITROTOLUENE	10	U		10	U		10	U		10	U		10	U	
2-CHLORONAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
2-CHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2-METHYLNAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
2-METHYLPHENOL	10	U		10	U		10	U		10	U		10	U	
2-NITROANILINE	24	U		26	U		24	UJ	f	25	UJ	f	24	UJ	f
2-NITROPHENOL	10	U		10	U		10	U		10	U		10	U	
3,3'-DICHLOROBENZIDINE	10	U		10	U		10	U		10	U		10	U	
3-NITROANILINE	24	U		26	U		24	U		25	U		24	U	
4,6-DINITRO-2-METHYLPHENOL	24	UJ	f	26	UJ	f	24	UJ	f	25	UJ	f	24	UJ	f
4-BROMOPHENYL-PHENYLETHER	10	U		10	U		10	U		10	U		10	U	
4-CHLORO-3-METHYLPHENOL	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
4-CHLOROANILINE	10	U		10	U		10	U		10	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		10	U		10	U		10	U		10	U	
4-METHYLPHENOL	10	U		10	U		10	U		10	U		10	U	
4-NITROANILINE	24	U		26	U		24	U		25	U		24	U	
4-NITROPHENOL	24	UJ	f	26	UJ	f	24	UJ	f	25	UJ	f	24	UJ	f
ACENAPHTHENE	6	J	e,g	10	U		10	U		10	U		10	U	
ACENAPHTHYLENE	10	U		10	U		10	U		10	U		10	U	
ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
BENZO(A)ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
BENZO(A)PYRENE	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
U - Non-detected
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
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d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-008 (UG/L)			122-S01-015 (UG/L)			122-S01-016 (UG/L)			122-S01-017 (UG/L)			122-S01-018 (UG/L)		
Sample Location	HP-S01-B4-15			HP-S01-B8-5			HP-S01-B8-15			HP-S01-B9-5			HP-S01-B9-15		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/28/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
BENZO(G,H,I)PERYLENE	10	U		10	U		10	U		10	U		10	U	
BENZO(K)FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		10	U		10	U		10	U		10	U	
BIS(2-CHLOROETHYL)ETHER	10	U		10	U		10	U		10	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	320	UJ	b,e	10	U		10	U		10	U		10	U	
BUTYLBENZYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
CARBAZOLE	10	U		10	U		10	U		10	U		10	U	
CHRYSENE	10	U		10	U		10	U		10	U		10	U	
DI-N-BUTYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DI-N-OCTYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DIBENZ(A,H)ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
DIBENZOFURAN	10	U		10	U		10	U		10	U		10	U	
DIETHYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DIMETHYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
FLUORENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROBUTADIENE	10	UJ	f	10	UJ	f	10	U		10	U		10	U	
HEXACHLOROCYCLOPENTADIENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
INDENO(1,2,3-CD)PYRENE	10	U		10	U		10	U		10	U		10	U	
ISOPHORONE	10	U		10	U		10	U		10	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
N-NITROSODIPHENYLAMINE (1)	10	U		10	U		10	U		10	U		10	U	
NAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
NITROBENZENE	10	U		10	U		10	U		10	U		10	U	
PENTACHLOROPHENOL	24	U		26	U		24	U		25	U		24	U	
PHENANTHRENE	10	U		10	U		10	U		10	U		10	U	
PHENOL	10	U		10	U		10	U		10	U		10	U	
PYRENE	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
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d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-019 (UG/L)			122-S01-020 (UG/L)			122-S01-105 (UG/L)			122-S01-106 (UG/L)			122-S01-107 (UG/L)		
Sample Location	HP-S01-B8-5			HP-S01-B8-15			FIELD BLANK			EQUIPMENT RINSATE			EQUIPMENT RINSATE		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U		5	U		5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		10	U		10	U		10	U		10	U	
2,4,5-TRICHLOROPHENOL	25	U		24	U		25	U		26	U		25	U	
2,4,6-TRICHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2,4-DICHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2,4-DIMETHYLPHENOL	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
2,4-DINITROPHENOL	25	UJ	f	24	UJ	f	25	UJ	f	26	UJ	f	25	UJ	f
2,4-DINITROTOLUENE	10	U		10	U		10	U		10	U		10	U	
2,6-DINITROTOLUENE	10	U		10	U		10	U		10	U		10	U	
2-CHLORONAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
2-CHLOROPHENOL	10	U		10	U		10	U		10	U		10	U	
2-METHYLNAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
2-METHYLPHENOL	10	U		10	U		10	U		10	U		10	U	
2-NITROANILINE	25	U		24	UJ	f	25	U		26	U		25	UJ	f
2-NITROPHENOL	10	U		10	U		10	U		10	U		10	U	
3,3'-DICHLOROBENZIDINE	10	U		10	U		10	U		10	U		10	U	
3-NITROANILINE	25	U		24	U		25	U		26	U		25	U	
4,6-DINITRO-2-METHYLPHENOL	25	UJ	f	24	UJ	f	25	UJ	f	26	UJ	f	25	UJ	f
4-BROMOPHENYL-PHENYLETHER	10	U		10	U		10	U		10	U		10	U	
4-CHLORO-3-METHYLPHENOL	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
4-CHLOROANILINE	10	U		10	U		10	U		10	U		10	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		10	U		10	U		10	U		10	U	
4-METHYLPHENOL	10	U		10	U		10	U		10	U		10	U	
4-NITROANILINE	25	U		24	U		25	U		26	U		25	U	
4-NITROPHENOL	25	UJ	f	24	UJ	f	25	UJ	f	26	UJ	f	25	UJ	f
ACENAPHTHENE	10	U		10	U		10	U		10	U		10	U	
ACENAPHTHYLENE	10	U		10	U		10	U		10	U		10	U	
ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
BENZO(A)ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
BENZO(A)PYRENE	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
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h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-019 (UG/L)			122-S01-020 (UG/L)			122-S01-105 (UG/L)			122-S01-106 (UG/L)			122-S01-107 (UG/L)		
Sample Location	HP-S01-B8-5			HP-S01-B8-15			FIELD BLANK			EQUIPMENT RINSATE			EQUIPMENT RINSATE		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/27/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
BENZO(G,H,I)PERYLENE	10	U		10	U		10	U		10	U		10	U	
BENZO(K)FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		10	U		10	U		10	U		10	U	
BIS(2-CHLOROETHYL)ETHER	10	U		10	U		10	U		10	U		10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U		10	U		10	U		10	U		65		
BUTYLBENZYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
CARBAZOLE	10	U		10	U		10	U		10	U		10	U	
CHRYSENE	10	U		10	U		10	U		10	U		10	U	
DI-N-BUTYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DI-N-OCTYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DIBENZ(A,H)ANTHRACENE	10	U		10	U		10	U		10	U		10	U	
DIBENZOFURAN	10	U		10	U		10	U		10	U		10	U	
DIETHYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
DIMETHYLPHTHALATE	10	U		10	U		10	U		10	U		10	U	
FLUORANTHENE	10	U		10	U		10	U		10	U		10	U	
FLUORENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROBUTADIENE	10	UJ	f	10	U		10	UJ	f	10	UJ	f	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U		10	U		10	U		10	U		10	U	
HEXACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
INDENO(1,2,3-CD)PYRENE	10	U		10	U		10	U		10	U		10	U	
ISOPHORONE	10	U		10	U		10	U		10	U		10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
N-NITROSODIPHENYLAMINE (1)	10	U		10	U		10	U		10	U		10	U	
NAPHTHALENE	10	U		10	U		10	U		10	U		10	U	
NITROBENZENE	10	U		10	U		10	U		10	U		10	U	
PENTACHLOROPHENOL	25	U		24	U		25	U		26	U		25	U	
PHENANTHRENE	10	U		10	U		10	U		10	U		10	U	
PHENOL	10	U		10	U		10	U		10	U		10	U	
PYRENE	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-001 (UG/L)			122-S01-002 (UG/L)			122-S01-003 (UG/L)			122-S01-004 (UG/L)			122-S01-005 (UG/L)		
Sample Location	HP-S01-B1-5			HP-S01-B1-15			HP-S01-B2-5			HP-S01-B2-15			HP-S01-B3-5		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			8.00 - 10.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Analyzed	12/14/99			12/14/99			12/14/99			12/14/99			12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	U		10	U		10	U		10	U	
BENZENE	10	U		10	U		10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-006 (UG/L)			122-S01-007 (UG/L)			122-S01-008 (UG/L)			122-S01-015 (UG/L)			122-S01-016 (UG/L)		
Sample Location	HP-S01-B3-15			HP-S01-B4-5			HP-S01-B4-15			HP-S01-B8-5			HP-S01-B8-15		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			13.00 - 15.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Analyzed	12/15/99			12/13/99			12/14/99			12/13/99			12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U		10	U		16		
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	UJ	f	10	UJ	f	10	UJ	f	10	UJ	f
BENZENE	10	U		10	U		10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		7	J	g	10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		7	J	g
TRICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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J - Estimated concentration

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Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-017 (UG/L)			122-S01-018 (UG/L)			122-S01-019 (UG/L)			122-S01-020 (UG/L)			122-S01-105 (UG/L)		
Sample Location	HP-S01-B9-5			HP-S01-B9-15			HP-S01-B8-5			HP-S01-B8-15			FIELD BLANK		
Sample Depth (ft)	6.00 - 8.00			13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Analyzed	12/15/99			12/15/99			12/13/99			12/13/99			12/15/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U		15			10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	U		10	UJ	f	10	UJ	f	10	U	
BENZENE	10	U		10	U		10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		6	J	g
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U		8	J	g	10	U	
VINYL CHLORIDE	10	U		10	U		10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-106 (UG/L)			122-S01-107 (UG/L)			122-S01-111 (UG/L)		
Sample Location	EQUIPMENT RINSATE			EQUIPMENT RINSATE					
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 ACW02			12/08/99 ACW02			12/08/99 ACW02		
Date Analyzed	12/14/99			12/14/99			12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U	
ACETONE	10	U		10	U		10	U	
BENZENE	10	U		10	U		10	U	
BROMODICHLOROMETHANE	10	U		10	U		10	U	
BROMOFORM	4	J	g	10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U	
CHLOROMETHANE	10	U		10	U		10	U	
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U	
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U	

Validity (Val):
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UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
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c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
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k - Holding time exceeded
p - >25%D between columns
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Note :

SEMIVOLATILE ORGANIC ANALYSIS [illegible]ATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:22

Matrix : WATER

TtEMI Sample ID / Units	122-S01-003 (UG/L)				TtEMI Sample ID / Units	122-S01-004 (UG/L)				TtEMI Sample ID / Units	122-S01-005 (UG/L)			
Sample Location	HP-S01-B2-5				Sample Location	HP-S01-B2-15				Sample Location	HP-S01-B3-5			
Lab Sample ID / SDG Number	9912G134-012 ACW02				Lab Sample ID / SDG Number	9912G134-013 ACW02				Lab Sample ID / SDG Number	9912G134-007 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Extracted	12/15/99				Date Extracted	12/15/99				Date Extracted	12/15/99			
Date Analyzed	12/28/99				Date Analyzed	12/28/99				Date Analyzed	12/27/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
DICHLORO BENZOIC ACID ISOMER	34	7.18	J		DICHLORO BENZOIC ACID ISOMER	7	7.15	J		UNKNOWN CYCLOHEXANOL	11	1.83	J	
SULFUR, MOL. (S8)	2	11.40	JN							UNKNOWN ALKYLBENZENE C9H12	4	3.23	J	
UNKNOWN PHTHALATE	3	16.65	J							UNKNOWN ALKYLBENZENE C9H12	8	3.56	J	
										UNKNOWN ALKYLBENZENE C9H12	3	3.80	J	
										UNKNOWN ALKYLBENZENE C9H8	9	3.98	J	
										BENZOTHIOPHENE ISOMER	4	4.97	J	
										NAPHTHALENE, 1-METHYL-	6	5.78	JN	
										ETHYL-NAPHTHALENE ISOMER	8	6.36	J	
										DIMETHYL-NAPHTHALENE ISOMER	10	6.45	J	
										DIMETHYL-NAPHTHALENE ISOMER	12	6.56	J	
										DIMETHYL-NAPHTHALENE ISOMER	10	6.59	J	
										DIMETHYL-NAPHTHALENE ISOMER	5	6.72	J	
										DIMETHYL-NAPHTHALENE ISOMER	4	6.84	J	
										NAPHTHALENECARBONITRILE ISOM	10	7.17	J	
										TRIMETHYL-NAPHTHALENE ISOMER	2	7.58	J	
										NAPHTHALENE ISOMER	3	8.11	J	
										DIBENZOFURAN ISOMER	3	8.20	J	
										UNKNOWN	5	8.40	J	
										STILBENE ISOMER	3	8.67	J	
										NAPHTHALENECARBOXYLIC ACID I	3	8.77	J	
										UNKNOWN ALKENE	5	8.85	J	
										UNKNOWN HYDROXYBIPHENYL	3	8.93	J	
										UNKNOWN ALKENE	5	9.18	J	
										DIBENZOTHIOPHENE	6	9.31	JN	
										UNKNOWN	2	9.66	J	
										UNKNOWN PAH	2	10.46	J	
										UNKNOWN PAH	4	10.50	J	
										UNKNOWN PAH	5	10.64	J	
										UNKNOWN	3	10.93	J	
										UNKNOWN ANTHRACENEDIONE	6	11.06	J	
										SULFUR	10	11.58	JN	
										BENZONAPHTHOFURAN ISOMER	3	12.21	J	
										UNKNOWN PAH	3	12.88	J	
										UNKNOWN PHTHALATE	4	16.22	J	
										UNKNOWN PAH	3	16.97	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

SEMIVOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:22

Matrix : WATER

TtEMI Sample ID / Units	122-S01-006 (UG/L)				TtEMI Sample ID / Units	122-S01-007 (UG/L)				TtEMI Sample ID / Units	122-S01-008 (UG/L)			
Sample Location	HP-S01-B3-15				Sample Location	HP-S01-B4-5				Sample Location	HP-S01-B4-15			
Lab Sample ID / SDG Number	9912G134-008 ACW02				Lab Sample ID / SDG Number	9912G134-005 ACW02				Lab Sample ID / SDG Number	9912G134-006 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Extracted	12/15/99				Date Extracted	12/15/99				Date Extracted	12/15/99			
Date Analyzed	12/27/99				Date Analyzed	12/28/99				Date Analyzed	12/27/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
BENZOFURAN ISOMER	2	4.38	J		CAMPHOR	3	4.57	JN		BENZOFURAN ISOMER	2	4.38	J	
NAPHTHALENECARBONITRILE ISOM	3	7.16	J		DICHLORO BENZOIC ACID ISOMER	8	7.15	J		UNKNOWN	11	7.24	J	
UNKNOWN	6	7.24	J		NAPHTHALENECARBOXYLIC ACID I	2	8.52	J		DICHLORO BENZOIC ACID ISOMER	11	7.29	J	
UNKNOWN ETHANONE	6	7.29	J		UNKNOWN	2	9.41	J		DIPHENYL METHYLPENTENE ISOME	40	9.01	J	
UNKNOWN	5	9.56	J		SULFUR, MOL. (S8)	29	11.41	JN		UNKNOWN	13	9.58	J	
SULFUR, MOL. (S8)	59	11.61	JN		UNKNOWN	2	13.95	J		UNKNOWN SULFUR BASED COMPOUN	5	9.93	J	
UNKNOWN TRIBUTYRIN	2	13.03	J		UNKNOWN	3	14.13	J		SULFUR, MOL. (S8)	180	11.64	JN	
UNKNOWN ACRIDONE	2	13.80	J		PHENANTHRENECARBOXYLIC ACID	34	14.30	J		UNKNOWN ALKENE	5	15.01	J	
UNKNOWN	2	14.35	J		UNKNOWN PHTHALATE	4	14.44	J		UNKNOWN	210	15.32	J	
UNKNOWN PHTHALATE	2	16.42	J		UNKNOWN PHTHALATE	2	14.57	J		UNKNOWN	46	15.61	J	
UNKNOWN PHTHALATE	4	16.56	J							SUBST. BENZENE	77	19.92	J	
UNKNOWN	3	16.79	J							SUBST. BENZENE	11	20.35	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration
NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

SEMIVOLATILE ORGANIC ANALYSIS ([redacted]ATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:22

Matrix : WATER

TtEMI Sample ID / Units	122-S01-015 (UG/L)				TtEMI Sample ID / Units	122-S01-016 (UG/L)				TtEMI Sample ID / Units	122-S01-017 (UG/L)			
Sample Location	HP-S01-B8-5				Sample Location	HP-S01-B8-15				Sample Location	HP-S01-B9-5			
Lab Sample ID / SDG Number	9912G134-001 ACW02				Lab Sample ID / SDG Number	9912G134-002 ACW02				Lab Sample ID / SDG Number	9912G134-016 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Extracted	12/15/99				Date Extracted	12/15/99				Date Extracted	12/15/99			
Date Analyzed	12/27/99				Date Analyzed	12/28/99				Date Analyzed	12/28/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN	4	7.24	J		DICHLORO BENZOIC ACID ISOMER	14	7.15	J		DICHLORO BENZOIC ACID ISOMER	33	7.17	J	
ETHANONE ISOMER	5	7.29	J		TETRASULFIDE ISOMER	3	11.41	J		UNKNOWN PHTHALATE	2	14.18	J	
UNKNOWN	6	9.57	J		UNKNOWN PHTHALATE	3	13.83	J		UNKNOWN PHTHALATE	2	14.26	J	
SULFUR	120	11.62	JN		UNKNOWN PHTHALATE	2	13.89	J		UNKNOWN PHTHALATE	2	14.62	J	
					UNKNOWN PHTHALATE	3	13.96	J						
					UNKNOWN PHTHALATE	3	14.14	J						
					UNKNOWN PHTHALATE	2	14.19	J						
					UNKNOWN PHTHALATE	4	14.26	J						
					UNKNOWN PHTHALATE	8	14.31	J						
					UNKNOWN PHTHALATE	2	14.44	J						
					UNKNOWN PHTHALATE	4	14.57	J						
					UNKNOWN PHTHALATE	4	14.62	J						
					UNKNOWN PHTHALATE	3	16.06	J						
					UNKNOWN PHTHALATE	2	16.26	J						

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

SEMIVOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:23

Matrix : WATER

TtEMI Sample ID / Units	122-S01-018 (UG/L)				TtEMI Sample ID / Units	122-S01-019 (UG/L)				TtEMI Sample ID / Units	122-S01-020 (UG/L)			
Sample Location	HP-S01-B9-15				Sample Location	HP-S01-B8-5				Sample Location	HP-S01-B8-15			
Lab Sample ID / SDG Number	9912G134-017 ACW02				Lab Sample ID / SDG Number	9912G134-003 ACW02				Lab Sample ID / SDG Number	9912G134-004 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Extracted	12/15/99				Date Extracted	12/15/99				Date Extracted	12/15/99			
Date Analyzed	12/28/99				Date Analyzed	12/27/99				Date Analyzed	12/28/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
DICHLORO BENZOIC ACID ISOMER	9	7.15	J		UNKNOWN CYCLOHEXANOL	3	1.82	J		UNKNOWN PHTHALATE	4	16.06	J	
SULFUR, MOL. (S8)	3	11.40	JN		DICHLORO BENZOIC ACID ISOMER	5	7.25	J		UNKNOWN PHTHALATE	3	16.52	J	
UNKNOWN PHTHALATE	4	14.25	J		SULFUR	26	11.58	JN		UNKNOWN PHTHALATE	3	16.62	J	
UNKNOWN PHTHALATE	8	14.30	J		UNKNOWN PHTHALATE	7	16.22	J		UNKNOWN PHTHALATE	7	16.66	J	
UNKNOWN PHTHALATE	4	14.43	J		UNKNOWN PHTHALATE	3	16.42	J		UNKNOWN	4	16.71	J	
UNKNOWN PHTHALATE	3	14.57	J		UNKNOWN PHTHALATE	3	16.56	J		UNKNOWN PHTHALATE	4	16.76	J	
UNKNOWN PHTHALATE	3	14.62	J							UNKNOWN PHTHALATE	5	16.81	J	
UNKNOWN PHTHALATE	5	16.06	J											
UNKNOWN PHTHALATE	3	16.26	J											

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:23

Matrix : WATER

TtEMI Sample ID / Units	122-S01-105 (UG/L)				TtEMI Sample ID / Units	122-S01-106 (UG/L)				TtEMI Sample ID / Units	122-S01-107 (UG/L)			
Sample Location	FIELD BLANK				Sample Location	EQUIPMENT RINSATE				Sample Location	EQUIPMENT RINSATE			
Lab Sample ID / SDG Number	9912G134-009 ACW02				Lab Sample ID / SDG Number	9912G134-010 ACW02				Lab Sample ID / SDG Number	9912G134-011 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Extracted	12/15/99				Date Extracted	12/15/99				Date Extracted	12/15/99			
Date Analyzed	12/27/99				Date Analyzed	12/27/99				Date Analyzed	12/28/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN AMIDE	4	13.85	J		UNKNOWN CYCLOHEXANOL	45	1.80	J		UNKNOWN CYCLOHEXENE	2	3.68	J	
UNKNOWN PHTHALATE	3	14.45	J		UNKNOWN SILOXANE	3	3.63	J		UNKNOWN PHTHALATE	4	12.97	J	
					DICHLORO BENZOIC ACID ISOMER	3	7.26	J		UNKNOWN PHTHALATE	2	13.11	J	
					UNKNOWN PHTHALATE	3	13.99	J		UNKNOWN	2	13.16	J	
					UNKNOWN PHTHALATE	3	14.11	J		UNKNOWN PHTHALATE	6	13.20	J	
					UNKNOWN PHTHALATE	6	14.41	J		UNKNOWN PHTHALATE	4	13.33	J	
					UNKNOWN PHTHALATE	6	14.46	J		UNKNOWN PHTHALATE	7	13.38	J	
					UNKNOWN PHTHALATE	4	14.72	J		UNKNOWN PHTHALATE	6	13.60	J	
					UNKNOWN PHTHALATE	6	14.77	J		UNKNOWN PHTHALATE	3	14.30	J	
					UNKNOWN PHTHALATE	3	14.85	J		UNKNOWN PHTHALATE	2	16.66	J	
					UNKNOWN PHTHALATE	4	16.22	J						
					UNKNOWN PHTHALATE	2	16.56	J						

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:23

Matrix : WATER

TtEMI Sample ID / Units	122-S01-001 (UG/L)				TtEMI Sample ID / Units	122-S01-002 (UG/L)				TtEMI Sample ID / Units	122-S01-003 (UG/L)			
Sample Location	HP-S01-B1-5				Sample Location	HP-S01-B1-15				Sample Location	HP-S01-B2-5			
Lab Sample ID / SDG Number	9912G134-014 ACW02				Lab Sample ID / SDG Number	9912G134-015 ACW02				Lab Sample ID / SDG Number	9912G134-012 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN ALCOHOL	17	13.06	J		UNKNOWN ALCOHOL	36	13.09	J		UNKNOWN ALCOHOL	12	13.09	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:23

Matrix : WATER

TtEMI Sample ID / Units	122-S01-004 (UG/L)				TtEMI Sample ID / Units	122-S01-005 (UG/L)				TtEMI Sample ID / Units	122-S01-006 (UG/L)			
Sample Location	HP-S01-B2-15				Sample Location	HP-S01-B3-5				Sample Location	HP-S01-B3-15			
Lab Sample ID / SDG Number	9912G134-013 ACW02				Lab Sample ID / SDG Number	9912G134-007 ACW02				Lab Sample ID / SDG Number	9912G134-008 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Analyzed	12/14/99				Date Analyzed	12/14/99				Date Analyzed	12/15/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN ALCOHOL	9	13.07	J		UNKNOWN ALCOHOL	9	13.08	J		UNKNOWN ALCOHOL	15	13.08	J	
					UNKNOWN	34	29.21	J		UNKNOWN	6	29.23	J	
					UNKNOWN	6	30.61	J						
					UNKNOWN	8	31.45	J						
					SUBST. BENZENE	10	32.51	J						

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:23

Matrix : WATER

TtEMI Sample ID / Units	122-S01-008 (UG/L)				TtEMI Sample ID / Units	122-S01-017 (UG/L)				TtEMI Sample ID / Units	122-S01-018 (UG/L)			
Sample Location	HP-S01-B4-15				Sample Location	HP-S01-B9-5				Sample Location	HP-S01-B9-15			
Lab Sample ID / SDG Number	9912G134-006 ACW02				Lab Sample ID / SDG Number	9912G134-016 ACW02				Lab Sample ID / SDG Number	9912G134-017 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Analyzed	12/14/99				Date Analyzed	12/15/99				Date Analyzed	12/15/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN	9	29.20	J		UNKNOWN ALCOHOL	44	13.09	J		UNKNOWN ALCOHOL	11	13.06	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration
NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:24

Matrix : WATER

TtEMI Sample ID / Units	122-S01-019 (UG/L)				TtEMI Sample ID / Units	122-S01-105 (UG/L)				TtEMI Sample ID / Units	122-S01-106 (UG/L)			
Sample Location	HP-S01-B8-5				Sample Location	FIELD BLANK				Sample Location	EQUIPMENT RINSATE			
Lab Sample ID / SDG Number	9912G134-003 ACW02				Lab Sample ID / SDG Number	9912G134-009 ACW02				Lab Sample ID / SDG Number	9912G134-010 ACW02			
Date Sampled	12/08/99				Date Sampled	12/08/99				Date Sampled	12/08/99			
Date Analyzed	12/13/99				Date Analyzed	12/15/99				Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN SILANE	21	15.42	J		SUBSTITUTED NAPTHALENE	8	30.52	J		UNKNOWN ALCOHOL	49	13.08	J	
					SUBSTITUTED NAPTHALENE	6	31.52	J						

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:24

Matrix : WATER

TtEMI Sample ID / Units	122-S01-107 (UG/L)			
Sample Location	EQUIPMENT RINSATE			
Lab Sample ID / SDG Number	9912G134-011 ACW02			
Date Sampled	12/08/99			
Date Analyzed	12/14/99			
Compound	Result	RT	Val	Com
UNKNOWN	9	26.20	J	
UNKNOWN SILANE	10	30.70	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration
NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

CLP PESTICIDE / PCBS ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/28/00

TtEMI Sample ID / Units	122-S01-150 (UG/L)		
Sample Location	DECON IDW		
Sample Depth (ft)	0.00 - 0.00		
Date Sampled / SDG Number	12/16/99 ACW04		
Date Extracted / Analyzed	12/23/99 12/23/99		
Analyte	Result	Val	Com
4,4'-DDD	0.11	U	
4,4'-DDE	0.11	UJ	f
4,4'-DDT	0.11	U	
ALDRIN	0.053	U	
ALPHA-BHC	0.053	UJ	f
ALPHA-CHLORDANE	0.053	U	
AROCLOR-1016	0.53	U	
AROCLOR-1221	0.53	U	
AROCLOR-1232	0.53	U	
AROCLOR-1242	0.53	U	
AROCLOR-1248	0.53	U	
AROCLOR-1254	0.53	U	
AROCLOR-1260	0.53	U	
BETA-BHC	0.053	U	
DELTA-BHC	0.053	UJ	f
DIELDRIN	0.11	U	
ENDOSULFAN I	0.053	U	
ENDOSULFAN II	0.11	U	
ENDOSULFAN SULFATE	0.11	U	
ENDRIN	0.11	U	
ENDRIN ALDEHYDE	0.11	U	
ENDRIN KETONE	0.11	U	
GAMMA-BHC (LINDANE)	0.053	U	
GAMMA-CHLORDANE	0.053	U	
HEPTACHLOR	0.011	UJ	f
HEPTACHLOR EPOXIDE	0.011	U	
METHOXYCHLOR	0.53	U	
TOXAPHENE	3.2	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-012 (UG/L)			122-S01-147 (UG/L)			122-S01-148 (UG/L)			122-S01-150 (UG/L)		
Sample Location	HP-S01-B6-15			HP-S01-B1-5A			HP-S01-B1-15A			DECON IDW		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			0.00 - 0.00		
Date Sampled / SDG Number	12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04		
Date Extracted / Analyzed	12/22/99 01/04/00			12/22/99 12/28/99			12/22/99 12/28/99			12/22/99 01/04/00		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	U		10	U		10	U		11	U	
1,2-DICHLOROBENZENE	5	U		5	U		5	U		5	U	
1,3-DICHLOROBENZENE	5	U		5	U		5	U		5	U	
1,4-DICHLOROBENZENE	5	U		5	U		5	U		5	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U		10	U		10	U		11	U	
2,4,5-TRICHLOROPHENOL	24	U		24	U		24	U		27	UJ	f
2,4,6-TRICHLOROPHENOL	10	U		10	U		10	U		11	U	
2,4-DICHLOROPHENOL	10	U		10	U		10	U		11	U	
2,4-DIMETHYLPHENOL	10	U		10	UJ	f	10	UJ	f	11	U	
2,4-DINITROPHENOL	24	UJ	f	24	UJ	f	24	UJ	f	27	U	
2,4-DINITROTOLUENE	10	U		10	U		10	U		11	U	
2,6-DINITROTOLUENE	10	U		10	U		10	U		11	U	
2-CHLORONAPHTHALENE	10	U		10	U		10	U		11	U	
2-CHLOROPHENOL	10	U		10	U		10	U		11	U	
2-METHYLNAPHTHALENE	10	U		10	U		10	U		8	J	g
2-METHYLPHENOL	10	U		10	U		10	U		11	U	
2-NITROANILINE	24	U		24	UJ	f	24	UJ	f	27	U	
2-NITROPHENOL	10	U		10	U		10	U		11	U	
3,3'-DICHLOROBENZIDINE	10	U		10	U		10	U		11	U	
3-NITROANILINE	24	U		24	U		24	U		27	U	
4,6-DINITRO-2-METHYLPHENOL	24	U		24	UJ	f	24	UJ	f	27	U	
4-BROMOPHENYL-PHENYLETHER	10	U		10	U		10	U		11	U	
4-CHLORO-3-METHYLPHENOL	10	U		10	UJ	f	10	UJ	f	11	U	
4-CHLOROANILINE	10	U		10	U		10	U		11	U	
4-CHLOROPHENYL-PHENYLETHER	10	U		10	U		10	U		11	U	
4-METHYLPHENOL	10	U		10	U		10	U		11	U	
4-NITROANILINE	24	U		24	U		24	U		27	U	
4-NITROPHENOL	24	U		24	UJ	f	24	UJ	f	27	U	
ACENAPHTHENE	10	U		10	U		10	U		8	J	g
ACENAPHTHYLENE	10	U		10	U		10	U		11	U	
ANTHRACENE	10	U		10	U		10	U		11	U	
BENZO(A)ANTHRACENE	10	U		10	U		10	U		11	U	
BENZO(A)PYRENE	10	U		10	U		10	U		11	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-012 (UG/L)			122-S01-147 (UG/L)			122-S01-148 (UG/L)			122-S01-150 (UG/L)		
Sample Location	HP-S01-B6-15			HP-S01-B1-5A			HP-S01-B1-15A			DECON IDW		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			0.00 - 0.00		
Date Sampled / SDG Number	12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04		
Date Extracted / Analyzed	12/22/99 01/04/00			12/22/99 12/28/99			12/22/99 12/28/99			12/22/99 01/04/00		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	U		10	U		10	U		11	U	
BENZO(G,H,I)PERYLENE	10	U		10	U		10	U		11	U	
BENZO(K)FLUORANTHENE	10	U		10	U		10	U		11	U	
BIS(2-CHLOROETHOXY)METHANE	10	U		10	U		10	U		11	U	
BIS(2-CHLOROETHYL)ETHER	10	U		10	U		10	U		11	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U		11	UJ	b	10	U		11	U	
BUTYLBENZYLPHTHALATE	10	U		10	U		10	U		11	U	
CARBAZOLE	10	U		10	U		10	U		11	U	
CHRYSENE	10	U		10	U		10	U		11	U	
DI-N-BUTYLPHTHALATE	10	U		10	U		10	U		11	U	
DI-N-OCTYLPHTHALATE	10	U		10	U		10	U		11	U	
DIBENZ(A,H)ANTHRACENE	10	U		10	U		10	U		11	U	
DIBENZOFURAN	10	U		10	U		10	U		5	J	g
DIETHYLPHTHALATE	10	U		10	U		10	U		11	U	
DIMETHYLPHTHALATE	10	U		10	U		10	U		11	U	
FLUORANTHENE	10	U		10	U		10	U		11	U	
FLUORENE	10	U		10	U		10	U		6	J	g
HEXACHLOROBENZENE	10	U		10	U		10	U		11	U	
HEXACHLOROBUTADIENE	10	U		10	U		10	U		11	U	
HEXACHLOROCYCLOPENTADIENE	10	U		10	U		10	U		11	U	
HEXACHLOROETHANE	10	U		10	U		10	U		11	U	
INDENO(1,2,3-CD)PYRENE	10	U		10	U		10	U		11	U	
ISOPHORONE	10	U		10	U		10	U		11	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U		10	UJ	f	10	UJ	f	11	U	
N-NITROSODIPHENYLAMINE (1)	10	U		10	U		10	U		11	U	
NAPHTHALENE	10	U		10	U		10	U		60		
NITROBENZENE	10	U		10	U		10	U		11	U	
PENTACHLOROPHENOL	24	UJ	f	24	U		24	U		27	UJ	f
PHENANTHRENE	10	U		10	U		10	U		6	J	g
PHENOL	10	U		10	U		10	U		11	U	
PYRENE	10	U		10	U		10	U		11	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-150 (UG/L)		
Sample Location	DECON IDW		
Sample Depth (ft)	0.00 - 0.00		
Date Sampled / SDG Number	12/16/99 ACW04		
Analyte	Result	Val	Com
ALUMINUM	7900	J	c
ANTIMONY	5.8	J	g
ARSENIC	6.7	J	g
BARIUM	75.1	J	g/h
BERYLLIUM	0.70	U	
CADMIUM	0.80	J	g
CALCIUM	66900		
CHROMIUM	68.2		
COBALT	6.3	J	g
COPPER	28.7		
IRON	9510		
LEAD	18.0	UJ	b
MAGNESIUM	38900		
MANGANESE	217		
MERCURY	0.13	J	g
MOLYBDENUM	34.6		
NICKEL	32.9		
POTASSIUM	40500	J	h
SELENIUM	3.6	UJ	f
SILVER	0.80	U	
SODIUM	669000		
THALLIUM	1.7	U	
VANADIUM	30.2	J	g
ZINC	710		

Validity (Val):
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UJ - Non-detected estimated
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Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-012 (UG/L)			122-S01-147 (UG/L)			122-S01-148 (UG/L)			122-S01-149 (UG/L)			122-S01-150 (UG/L)		
Sample Location	HP-S01-B6-15			HP-S01-B1-5A			HP-S01-B1-15A			TRIP BLANK			DECON IDW		
Sample Depth (ft)	13.00 - 15.00			6.00 - 8.00			13.00 - 15.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04			12/16/99 ACW04		
Date Analyzed	12/29/99			12/29/99			12/29/99			12/29/99			12/29/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2,2-TETRACHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1,2-TRICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,1-DICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROETHENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	
1,2-DICHLOROPROPANE	10	U		10	U		10	U		10	U		10	U	
2-BUTANONE	10	U		10	U		10	U		10	U		10	U	
2-HEXANONE	10	U		10	U		10	U		10	U		10	U	
4-METHYL-2-PENTANONE	10	U		10	U		10	U		10	U		10	U	
ACETONE	10	U		10	U		10	U		10	U		10	U	
BENZENE	10	U		10	U		10	U		10	U		12		
BROMODICHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
BROMOFORM	10	U		10	U		10	U		10	U		10	U	
BROMOMETHANE	10	U		10	U		10	U		10	U		10	U	
CARBON DISULFIDE	10	U		10	U		10	U		10	U		10	U	
CARBON TETRACHLORIDE	10	U		10	U		10	U		10	U		10	U	
CHLOROBENZENE	10	U		10	U		10	U		10	U		10	U	
CHLOROETHANE	10	U		10	U		10	U		10	U		10	U	
CHLOROFORM	10	U		10	U		10	U		10	U		10	U	
CHLOROMETHANE	10	UJ	f	10	U		10	UJ	f	10	UJ	f	10	UJ	f
CIS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
DIBROMOCHLOROMETHANE	10	U		10	U		10	U		10	U		10	U	
ETHYLBENZENE	10	U		10	U		10	U		10	U		10	U	
METHYLENE CHLORIDE	10	U		10	U		10	U		10	U		10	U	
STYRENE	10	U		10	U		10	U		10	U		10	U	
TETRACHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
TOLUENE	10	U		10	U		10	U		10	U		26		
TRANS-1,3-DICHLOROPROPENE	10	U		10	U		10	U		10	U		10	U	
TRICHLOROETHENE	10	U		10	U		10	U		10	U		10	U	
VINYL CHLORIDE	10	U		10	U		10	U		10	U		10	U	
XYLENE (TOTAL)	10	U		10	U		10	U		10	U		10	U	

Validity (Val):
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

SEMIVOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1BC -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:52

Matrix : WATER

TtEMI Sample ID / Units	122-S01-012 (UG/L)				TtEMI Sample ID / Units	122-S01-147 (UG/L)				TtEMI Sample ID / Units	122-S01-148 (UG/L)			
Sample Location	HP-S01-B6-15				Sample Location	HP-S01-B1-5A				Sample Location	HP-S01-B1-15A			
Lab Sample ID / SDG Number	9912G303-004 ACW04				Lab Sample ID / SDG Number	9912G303-001 ACW04				Lab Sample ID / SDG Number	9912G303-002 ACW04			
Date Sampled	12/16/99				Date Sampled	12/16/99				Date Sampled	12/16/99			
Date Extracted	12/22/99				Date Extracted	12/22/99				Date Extracted	12/22/99			
Date Analyzed	01/04/00				Date Analyzed	12/28/99				Date Analyzed	12/28/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
SULFUR, MOL. (S8)	4	8.03	JN		DICHLORO BENZOIC ACID ISOMER	15	7.18	J		DICHLORO BENZOIC ACID ISOMER	10	7.16	J	
SULFUR, MOL. (S8)	25	12.55	JN		UNKNOWN PHTHALATE	2	14.25	J						
UNKNOWN	3	16.65	J		UNKNOWN PHTHALATE	2	14.31	J						
UNKNOWN PHTHALATE	5	16.91	J		UNKNOWN PHTHALATE	2	14.62	J						
UNKNOWN PHTHALATE	2	17.26	J											

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:52

Matrix : WATER

TtEMI Sample ID / Units	122-S01-150 (UG/L)			
Sample Location	DECON IDW			
Lab Sample ID / SDG Number	9912G303-005 ACW04			
Date Sampled	12/16/99			
Date Extracted	12/22/99			
Date Analyzed	01/04/00			
Compound	**Result**	**RT**	**Val**	**Com**
SUBST. INDENE	4	4.36	J	
UNKNOWN ACID	5	6.54	J	
BIPHENYL	3	6.82	JN	
UNKNOWN SILOXANE	2	7.37	J	
UNKNOWN ALKENE	9	7.49	J	
DICHLORO BENZOIC ACID ISOMER	3	7.84	J	
UNKNOWN ACID	16	8.20	J	
UNKNOWN	2	9.07	J	
UNKNOWN ALKYLBENZENE C17H28	2	9.15	J	
UNKNOWN ALCOHOL	13	9.25	J	
UNKNOWN ALKYLBENZENE C17H28	4	9.49	J	
UNKNOWN ALKYLBENZENE C18H30	7	9.72	J	
UNKNOWN ALKYLBENZENE C18H30	3	10.03	J	
UNKNOWN ALKYLBENZENE C18H30	6	10.38	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TENTATIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:52

Matrix : WATER

TtEMI Sample ID / Units	122-S01-012 (UG/L)				TtEMI Sample ID / Units	122-S01-147 (UG/L)				TtEMI Sample ID / Units	122-S01-148 (UG/L)			
Sample Location	HP-S01-B6-15				Sample Location	HP-S01-B1-5A				Sample Location	HP-S01-B1-15A			
Lab Sample ID / SDG Number	9912G303-004 ACW04				Lab Sample ID / SDG Number	9912G303-001 ACW04				Lab Sample ID / SDG Number	9912G303-002 ACW04			
Date Sampled	12/16/99				Date Sampled	12/16/99				Date Sampled	12/16/99			
Date Analyzed	12/29/99				Date Analyzed	12/29/99				Date Analyzed	12/29/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN SILOXANE	13	14.99	J		UNKNOWN SILOXANE	11	20.85	J		UNKNOWN SILOXANE	30	28.41	J	
UNKNOWN SILOXANE	12	20.86	J		UNKNOWN SILOXANE	45	28.41	J		UNKNOWN SILOXANE	10	31.02	J	
UNKNOWN SILOXANE	19	26.23	J		UNKNOWN SILOXANE	11	31.02	J						
UNKNOWN SILOXANE	28	28.40	J											
UNKNOWN SILOXANE	28	31.02	J											

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

VOLATILE ORGANIC ANALYSIS (TIVELY IDENTIFIED COMPOUNDS)

FORM 1A -- EPA Specification OLM 01.1.1 (format A)

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois
Reviewer : TtEMI
Date : 02/28/00 12:49:52

Matrix : WATER

TtEMI Sample ID / Units	122-S01-149 (UG/L)				TtEMI Sample ID / Units	122-S01-150 (UG/L)			
Sample Location	TRIP BLANK				Sample Location	DECON IDW			
Lab Sample ID / SDG Number	9912G303-003 ACW04				Lab Sample ID / SDG Number	9912G303-005 ACW04			
Date Sampled	12/16/99				Date Sampled	12/16/99			
Date Analyzed	12/29/99				Date Analyzed	12/29/99			
Compound	Result	RT	Val	Com	Compound	Result	RT	Val	Com
UNKNOWN SILOXANE	15	15.02	J		UNKNOWN SILOXANE	100	13.16	J	
UNKNOWN SILOXANE	11	26.25	J		UNKNOWN SILOXANE	120	14.98	J	
UNKNOWN SILOXANE	27	28.41	J		UNKNOWN ALKANE	34	20.31	J	
UNKNOWN SILOXANE	26	31.03	J		UNKNOWN SILOXANE	76	20.84	J	
					UNKNOWN SILOXANE	37	26.22	J	
					UNKNOWN SILOXANE	86	28.41	J	
					UNKNOWN SILOXANE	34	31.01	J	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

ALKALINITY ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-121 (MG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/15/99			/ / 12/15/99		
Analyte	Result	Val	Com	Result	Val	Com
ALKALINITY SOLUBLE	401			419		
ALKALINITY, BICARB. AS CACO3	400			396		
ALKALINITY, CARB. AS CACO3	10	U		10	U	
ALKALINITY, HYDROX. AS CACO3	10	U		10	U	
ALKALINITY, TOTAL	400			396		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

MAJOR ANIONS ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-121 (MG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Analyte	Result	Val	Com	Result	Val	Com
NITRATE	0.10	U		0.12		
NITRATE SOLUBLE	0.10	U		0.10	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

HEXAVALENT CHROMIUM ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-121 (MG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/10/99			/ / 12/10/99		
Analyte	Result	Val	Com	Result	Val	Com
CHROMIUM VI	0.020	R	c	0.020	R	c
CHROMIUM VI SOLUBLE	0.020	R	c	0.020	R	c

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

CLP CYANIDE ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-118 (UG/L)			122-S01-120 (UG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/18/99			/ / 12/18/99		
Analyte	Result	Val	Com	Result	Val	Com
CYANIDE	10.0	U		10.0	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

CLP METALS (DISSOLVED) ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

TtEMI Sample ID / Units	122-S01-119 (UG/L)			122-S01-121 (UG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Analyte	Result	Val	Com	Result	Val	Com
CHROMIUM	2.6	U		2.6	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-121 (MG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/22/99			/ / 12/22/99		
Analyte	Result	Val	Com	Result	Val	Com
OIL/GREASE GRAV SPK	6.0	UJ	c	6.1	UJ	c

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TDS, TSS ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-121 (MG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/15/99			/ / 12/15/99		
Analyte	Result	Val	Com	Result	Val	Com
TOTAL SUSPENDED SOLIDS	51			51		

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-119 (MG/L)			122-S01-119 (MG/L)			122-S01-121 (MG/L)			122-S01-121 (MG/L)		
Sample Location												
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	12/22/99			/ / 12/15/99			12/22/99			/ / 12/15/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
SULFIDE	2.1			2.1			2.0			2.0		
SULFIDE SOLUBLE	4.8	J	k	4.8	J	k	5.0	J	k	5.0	J	k

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-119 (UG/L)			122-S01-119DL1 (UG/L)			122-S01-119DL2 (UG/L)			122-S01-121 (UG/L)			122-S01-121DL1 (UG/L)		
Sample Location															
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/29/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,2,4-TRICHLOROBENZENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
1,2-DICHLOROBENZENE	32	J	a,e	24	DU		480	DU		17	J	a,e	20	DU	
1,3-DICHLOROBENZENE	5	UJ	a	24	DU		480	DU		5	UJ	a	20	DU	
1,4-DICHLOROBENZENE	6	J	a,e	24	DU		480	DU		5	UJ	a	20	DU	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
2,4,5-TRICHLOROPHENOL	24	U		120	DU		2400	DU		25	U		99	DU	
2,4,6-TRICHLOROPHENOL	10	U		48	DU		960	DU		10	U		40	DU	
2,4-DICHLOROPHENOL	10	U		48	DU		960	DU		10	U		40	DU	
2,4-DIMETHYLPHENOL	4900			1600	DE		4900	D		2100	J	f	850	DE	
2,4-DINITROPHENOL	24	UJ	f	120	DU		2400	DU		25	UJ	f	99	DU	
2,4-DINITROTOLUENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
2,6-DINITROTOLUENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
2-CHLORONAPHTHALENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
2-CHLOROPHENOL	10	U		48	DU		960	DU		10	U		40	DU	
2-METHYLNAPHTHALENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
2-METHYLPHENOL	1000			900	DE		1000	D		440			380	DE	
2-NITROANILINE	24	UJ	a	120	DU		2400	DU		25	UJ	a	99	DU	
2-NITROPHENOL	10	U		48	DU		960	DU		10	U		40	DU	
3,3'-DICHLOROBENZIDINE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
3-NITROANILINE	24	UJ	a	120	DU		2400	DU		25	UJ	a	99	DU	
4,6-DINITRO-2-METHYLPHENOL	24	UJ	f	120	DU		2400	DU		25	UJ	f	99	DU	
4-BROMOPHENYL-PHENYLETHER	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
4-CHLORO-3-METHYLPHENOL	10	UJ	f	48	DU		960	DU		10	UJ	f	40	DU	
4-CHLOROANILINE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
4-CHLOROPHENYL-PHENYLETHER	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
4-METHYLPHENOL	190			190	D		960	DU		63	J	e	73	D	
4-NITROANILINE	24	UJ	a	120	DU		2400	DU		25	UJ	a	99	DU	
4-NITROPHENOL	24	UJ	f	120	DU		2400	DU		25	UJ	f	99	DU	
ACENAPHTHENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
ACENAPHTHYLENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
ANTHRACENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BENZO(A)ANTHRACENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BENZO(A)PYRENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	

Validity (Val):
U - Non-detected
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-119 (UG/L)			122-S01-119DL1 (UG/L)			122-S01-119DL2 (UG/L)			122-S01-121 (UG/L)			122-S01-121DL1 (UG/L)		
Sample Location															
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	12/15/99 12/27/99			12/15/99 12/28/99			12/15/99 12/29/99			12/15/99 12/27/99			12/15/99 12/28/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
BENZO(B)FLUORANTHENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BENZO(G,H,I)PERYLENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BENZO(K)FLUORANTHENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BIS(2-CHLOROETHOXY)METHANE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BIS(2-CHLOROETHYL)ETHER	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
BUTYLBENZYLPHTHALATE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
CARBAZOLE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
CHRYSENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
DI-N-BUTYLPHTHALATE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
DI-N-OCTYLPHTHALATE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
DIBENZ(A,H)ANTHRACENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
DIBENZOFURAN	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
DIETHYLPHTHALATE	10	UJ	a,b	48	DU		960	DU		10	UJ	a,b	40	DU	
DIMETHYLPHTHALATE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
FLUORANTHENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
FLUORENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
HEXACHLOROBENZENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
HEXACHLOROBUTADIENE	10	UJ	a	48	DU		960	DU		10	UJ	f	40	DU	
HEXACHLOROCYCLOPENTADIENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
HEXACHLOROETHANE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
INDENO(1,2,3-CD)PYRENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
ISOPHORONE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
N-NITROSO-DI-N-PROPYLAMINE	10	UJ	f	48	DU		960	DU		10	UJ	f	40	DU	
N-NITROSODIPHENYLAMINE (1)	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
NAPHTHALENE	43	J	a	48	DU		960	DU		6	J	a,g	40	DU	
NITROBENZENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
PENTACHLOROPHENOL	24	U		120	DU		2400	DU		25	U		99	DU	
PHENANTHRENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	
PHENOL	9	J	e,g	48	DU		960	DU		10	U		40	DU	
PYRENE	10	UJ	a	48	DU		960	DU		10	UJ	a	40	DU	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-121DL2 (UG/L)		
Sample Location			
Sample Depth (ft)	0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03		
Date Extracted / Analyzed	12/15/99 12/29/99		
Analyte	Result	Val	Com
1,2,4-TRICHLOROBENZENE	400	DU	
1,2-DICHLOROBENZENE	200	DU	
1,3-DICHLOROBENZENE	200	DU	
1,4-DICHLOROBENZENE	200	DU	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	DU	
2,4,5-TRICHLOROPHENOL	990	DU	
2,4,6-TRICHLOROPHENOL	400	DU	
2,4-DICHLOROPHENOL	400	DU	
2,4-DIMETHYLPHENOL	2100	D	
2,4-DINITROPHENOL	990	DU	
2,4-DINITROTOLUENE	400	DU	
2,6-DINITROTOLUENE	400	DU	
2-CHLORONAPHTHALENE	400	DU	
2-CHLOROPHENOL	400	DU	
2-METHYLNAPHTHALENE	400	DU	
2-METHYLPHENOL	440	D	
2-NITROANILINE	990	DU	
2-NITROPHENOL	400	DU	
3,3'-DICHLOROBENZIDINE	400	DU	
3-NITROANILINE	990	DU	
4,6-DINITRO-2-METHYLPHENOL	990	DU	
4-BROMOPHENYL-PHENYLETHER	400	DU	
4-CHLORO-3-METHYLPHENOL	400	DU	
4-CHLOROANILINE	400	DU	
4-CHLOROPHENYL-PHENYLETHER	400	DU	
4-METHYLPHENOL	400	DU	
4-NITROANILINE	990	DU	
4-NITROPHENOL	990	DU	
ACENAPHTHENE	400	DU	
ACENAPHTHYLENE	400	DU	
ANTHRACENE	400	DU	
BENZO(A)ANTHRACENE	400	DU	
BENZO(A)PYRENE	400	DU	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

TtEMI Sample ID / Units	122-S01-121DL2 (UG/L)		
Sample Location			
Sample Depth (ft)	0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03		
Date Extracted / Analyzed	12/15/99 12/29/99		
Analyte	Result	Val	Com
BENZO(B)FLUORANTHENE	400	DU	
BENZO(G,H,I)PERYLENE	400	DU	
BENZO(K)FLUORANTHENE	400	DU	
BIS(2-CHLOROETHOXY)METHANE	400	DU	
BIS(2-CHLOROETHYL)ETHER	400	DU	
BIS(2-ETHYLHEXYL)PHTHALATE	400	DU	
BUTYLBENZYLPHTHALATE	400	DU	
CARBAZOLE	400	DU	
CHRYSENE	400	DU	
DI-N-BUTYLPHTHALATE	400	DU	
DI-N-OCTYLPHTHALATE	400	DU	
DIBENZ(A,H)ANTHRACENE	400	DU	
DIBENZOFURAN	400	DU	
DIETHYLPHTHALATE	400	DU	
DIMETHYLPHTHALATE	400	DU	
FLUORANTHENE	400	DU	
FLUORENE	400	DU	
HEXACHLOROBENZENE	400	DU	
HEXACHLOROBUTADIENE	400	DU	
HEXACHLOROCYCLOPENTADIENE	400	DU	
HEXACHLOROETHANE	400	DU	
INDENO(1,2,3-CD)PYRENE	400	DU	
ISOPHORONE	400	DU	
N-NITROSO-DI-N-PROPYLAMINE	400	DU	
N-NITROSODIPHENYLAMINE (1)	400	DU	
NAPHTHALENE	400	DU	
NITROBENZENE	400	DU	
PENTACHLOROPHENOL	990	DU	
PHENANTHRENE	400	DU	
PHENOL	400	DU	
PYRENE	400	DU	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

CLP METALS (TOTAL) ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

TtEMI Sample ID / Units	122-S01-119 (UG/L)			122-S01-121 (UG/L)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Analyte	Result	Val	Com	Result	Val	Com
CHROMIUM	2.6	U		2.6	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TURBIDITY ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Severn Trent Laboratory, Illinois

Matrix : WATER

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-119 (NTU)			122-S01-121 (NTU)		
Sample Location						
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03		
Date Extracted / Analyzed	/ / 12/14/99			/ / 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com
TURBIDITY	140	J	k	132	J	k

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-119 (UG/L)			122-S01-119DL (UG/L)			122-S01-121 (UG/L)			122-S01-121DL (UG/L)		
Sample Location												
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03			12/09/99 ACW03		
Date Analyzed	12/15/99			12/15/99			12/15/99			12/15/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
1,1,2,2-TETRACHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
1,1,2-TRICHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
1,1-DICHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
1,1-DICHLOROETHENE	1000	U		5000	DU		1000	U		5000	DU	
1,2-DICHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
1,2-DICHLOROETHENE (TOTAL)	32000			42000	D		30000			36000	D	
1,2-DICHLOROPROPANE	1000	U		5000	DU		1000	U		5000	DU	
2-BUTANONE	1000	U		5000	DU		1000	U		5000	DU	
2-HEXANONE	1000	U		5000	DU		1000	U		5000	DU	
4-METHYL-2-PENTANONE	1000	U		5000	DU		1000	U		5000	DU	
ACETONE	1000	UJ	f	5000	DU		1000	UJ	f	5000	DU	
BENZENE	1000	U		5000	DU		1000	U		5000	DU	
BROMODICHLOROMETHANE	1000	U		5000	DU		1000	U		5000	DU	
BROMOFORM	1000	U		5000	DU		1000	U		5000	DU	
BROMOMETHANE	1000	U		5000	DU		1000	U		5000	DU	
CARBON DISULFIDE	1000	U		5000	DU		1000	U		5000	DU	
CARBON TETRACHLORIDE	1000	U		5000	DU		1000	U		5000	DU	
CHLOROBENZENE	1000	U		5000	DU		1000	U		5000	DU	
CHLOROETHANE	1000	U		5000	DU		1000	U		5000	DU	
CHLOROFORM	1000	U		5000	DU		1000	U		5000	DU	
CHLOROMETHANE	1000	U		5000	DU		1000	U		5000	DU	
CIS-1,3-DICHLOROPROPENE	1000	U		5000	DU		1000	U		5000	DU	
DIBROMOCHLOROMETHANE	1000	U		5000	DU		1000	U		5000	DU	
ETHYLBENZENE	1000	U		5000	DU		1000	U		5000	DU	
METHYLENE CHLORIDE	1000	U		5000	DU		1000	U		5000	DU	
STYRENE	1000	U		5000	DU		1000	U		5000	DU	
TETRACHLOROETHENE	1000	U		5000	DU		1000	U		5000	DU	
TOLUENE	3000			5000	DU		2800			5000	DU	
TRANS-1,3-DICHLOROPROPENE	1000	U		5000	DU		1000	U		5000	DU	
TRICHLOROETHENE	1000	U		5000	DU		1000	U		5000	DU	
VINYL CHLORIDE	48000			48000	D		41000			41000	D	
XYLENE (TOTAL)	1000	U		5000	DU		1000	U		5000	DU	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
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Applicable Comments (Com):
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Note :

APPENDIX C

INTERPHASE ENVIRONMENTAL, INC.
MOBILE LABORATORIES AND DIRECT PUSH DRILLING

Soil Gas Investigation

Site:
Navy Installation Restoration Site I
Alameda Point

Alameda, California

Project Number 99141

Submitted to:

Ms. Nadia Burelson
Tetra Tech EM, Inc.
10670 White Rock Road, # 100
Rancho Cordova, CA 95670

Submitted by:

InterPhase Environmental, Inc.
6200 Peachtree Street
Los Angeles, California 90040

December 29, 1999

INTERPHASE ENVIRONMENTAL, INC.

DOCUMENT REVIEW SHEET

Project Number: 99141

Client Name: Mr. Charles Schmidt
CE Schmidt
19200 Live Oak Road
Red Bluff, CA 96080

Document Name: Alameda Point
Alameda, CA

Prepared By: _____ Date: _____
Paola Calderon, Project Coordinator
InterPhase Environmental, Inc.

Approved By: _____ Date: _____
David Q. Feng, Director of Laboratories
InterPhase Environmental, Inc.

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LIST OF TABLES

Introduction

This report presents the methods and results of the soil gas investigation performed on Tuesday December 7 and Wednesday, December 8, 1999 at the Navy Installation Restoration Site I located in Alameda, California. The investigation was conducted by InterPhase Environmental, Inc. (InterPhase) under contract to CE Schmidt and Tetra Tech EM, Inc. (TtEMI). Soil gas sampling and analyses were performed in accordance with our firms Standard Operating Procedures, which was based on the guidelines for soil gas investigation set by California Regional Water Quality Control Board, Los Angeles (February 25, 1997).

Background & Theory

Soil gas surveys consist of the sampling and analysis of the soil gases that reside in the pore space of the unsaturated zone above the water table. Because many common organic compounds and industrial solvents exhibit significant vapor pressures and relatively low solubility in water, their introduction into subsurface soils results in vapor phase permeation and transport. Should these chemicals reach the water table and travel with the groundwater, vapors will continue to emanate from the contaminated groundwater into overlying soil. Thus, organic contamination of the subsurface and, possibly, of groundwater can be detected by measuring the concentration of volatile organic compounds (VOCs) in the soil gas.

Whatever is the source of the VOC in soil gas, its concentration is representative of soil contamination at the point of measurement. Volatile organic contaminants are distributed in three phases of soil, i.e., the gas phase in unsaturated pore spaces, the water contained in the unsaturated soils, and the surface of soil particles. The sum of the VOCs contained in the three phases divided by soil mass gives the total soil contaminant concentration.

Within the soil volume examined by soil gas sampling, equilibrium between the three phases is rapidly attained. The partitioning of the VOCs between gas, liquid and solid phases depends on both the soil properties and the chemical properties of the organic contaminants. Thus, given the chemical properties of the VOC and relevant soil parameters, soil-gas data can be used to calculate soil contamination.

Chemical properties of particular organic compounds (i.e., vapor pressure, solubility) are well known. Important soil parameters that affect the distribution of VOCs in three phases include the soil's natural and organic content, moisture, particle size and mineralogy, temperature, lithology, and heterogeneity. These parameters can either be measured or reasonably estimated. Some of these soil parameters (i.e., bulk density, porosity) have relatively little effect on soil concentration calculations. The soil organic and moisture content are two important parameters having greater

effect on the soil contamination calculations. They should be measured or estimated more carefully.

Detectable soil gas concentrations indicate either subsurface or groundwater contamination. Study of concentration distribution provides information on the source and nature of contamination. Away from source areas (i.e., underground storage tanks, surface spills, etc.), where only the groundwater is providing a significant soil gas concentration, soil gas can be an excellent relative indicator of groundwater contamination. The effectiveness of a soil gas survey to delineate groundwater contamination is variable. It depends on the depth of groundwater, contaminant concentration in the groundwater, distribution of air permeability in the unsaturated zone, and attenuation of the volatile organics by biodegradation or adsorption.

Use of soil gas to infer concentrations of sources at distance (such as groundwater plumes) is necessarily much more qualitative. Soil gas data used in this manner are limited by the lack of information regarding the soil parameters interposed between the source and sampling point. It is, therefore, generally not possible to quantitatively estimate groundwater concentrations from soil gas data collected at distance from the saturated interface.

For an investigation of volatile organic contamination, soil gas sampling and analysis provide most cost-effective and quickest results. Also, soil gas survey provide more accurate and better representative results than collecting and analyzing soil samples. Because, for soil samples, avoiding loss of total gas phase component and partial liquid and solid phase components is impossible. This is due to exposure of soil samples to the atmosphere during sample handling. Since the gas phase contaminant is a significant part of the total amount of soil contaminant, this loss introduces a large error to the results of soil sample analysis. The soil gas samples, in contrast, are handled in closed containers such as syringes, tedlar bags, or stainless steel canisters. Therefore, no loss of target concentration should occur. Besides, due to the nature of heterogeneity, a true average over the sampled volume can hardly be achieved for a soil sample. While a soil gas sample is always homogeneous and representative of the equilibrium concentration at the direct vicinity of the sample probe.

Scope of Work

This soil gas survey was conducted on December 7th & 8th, 1999 at the Alameda Point in Alameda, California. A total of thirty two (32) soil gas samples were collected and analyzed. All samples were collected at a target depth of 3 feet below ground surface utilizing direct-push sampling equipment.

All soil gas samples were analyzed on site for the target compounds listed in Table 1.

Table 1. Target Analytes

Compound	Detection Limits (ug/L) Air
Vinyl chloride	1
Chloroethane	1
Methyl Chloride	1
Acetone	5
1,1-dichloroethene	1
1,1-dichloroethane	1
1,2 dichloroethene	1
Chloroform	1
1,2-dichloroethane	1
2-Butanone	5
1,1,1-trichloroethane	1
Carbon tetrachloride	1
Trichloroethene	1
1,1,2-trichloroethane	1
Benzene	1
4-Methyl-2-pentanone	5
2-Hexanone	5
Tetrachloroethene	1
Toluene	1
1,1,2,2-tetrachloroethane	1
Chlorobenzene	1
Ethylbenzene	1
	Air (% v/v)
Methane	0.001%

Methods and Instrumentation

Sample Collection

Soil Gas Sampling Apparatus

Soil gas probes were advanced using a Geoprobe® Direct Push Sampling Rig. "Post-Run" method of sampling was used. In this method, the sample tubing is not carried in the probe rod during probe driving, but rather inserted down the bore after the appropriate sample depth is reached.

Sampling probe rod consists of section(s) of 1 ¼ - inch outer diameter hardened steel pipe. A point holder adapter is mounted on the distal (deep) end of the sampling train. A stainless steel

adapter is connected to ¼-inch clean, virgin polyethylene tubing, lowered down the bore of the drive probe string, and mated to the point holder adapter. An o-ring seal enables the system to form a vacuum-tight space to assure that the gas sample is collected at the bottom. Hamilton or Dynatech 10-cc gas-tight, glass syringes are used to collect soil gas samples.

Pre-Sample Purge

In order to collect a representative soil gas samples, the ambient air residing in the sampling system must be removed before the soil gas sample is drawn from the probe. For this purpose, certain amount of sample gas is drawn by a vacuum device to purge the system. Normally, a volume of sample gas equivalent to three times of sampling probe volume is used to purge the system.

Sampling Procedure

A soil gas sampling probe was driven to the depth, then pulled up a half inch to create a gap for the soil vapor to enter the probe. The sampling adapter and polyethylene tubing were inserted into the drive rod and coupled to the point holder. The purge volume of vapor was drawn from the sampling system by using a 60 cc plastic syringe. After the system resumed the normal pressure the sample was drawn from the system using the sampling syringe.

Sample Analysis

All soil gas samples were analyzed at InterPhase's on site mobile laboratory. The target analytes, which were required by the guideline of CRWQCB, were analyzed by usin the laboratory's general Standard Operation Procedure (SOP). For general soil gas investigations InterPhase's mobile laboratories use modified EPA Methods 8010 and 8020 which is equivalant Method 8021 specified in the scope of work. Unlike many mobile laboratories that use purge and trap based method 8010/8020, InterPhase laboratories designed an all-gas-phase method based on the USEPA methods TO-14, 8010 and 8020. This method is able to avoid the errors introduced by using purge and trap devices and those false assumptions applied for quantification of gas samples with liquid standards. Specially designed procedures are applied to soil gas analyses which provide the best attainable data quality. InterPhase's soil gas laboratories meet or exceed the requirements set by the California Regional Water Quality Control Board (CRWQCB) Los Angeles Region's Interim Guidance for Active Soil Gas Investigation. They are also capable to meet USEPA level three QA/QC requirements.

Samples were introduced into fixed volume sample loops and injected into the GC by a computer controlled valve system. The carrier gas with the injected sample was split and led to two separate capillary columns. The first column (DB-624) was connected to a photoionization detector (PID) for detecting aromatic and unsaturated organic contaminants. The outlet of PID is

connected to an electrolytic conductivity detector (ELCD) for detecting halogenated organic contaminants. The second column (DB-1) was connected to a flame ionization detector (FID) for confirmation of compounds detected on other two detectors. Since 1,1-dichloroethene and Freon113 coelude on first column, these two compounds were measured on PID and FID, respectively. All analyses used a temperature program starting at 10°C, no hold, ramp at 10°/minute to 50°C, no hold, ramp at 5°/minute to 100°C, no hold, ramp at 20°/minute to 170°C, no hold. The temperature program took 17.5 minutes to complete.

The standard operation procedure of the mobile laboratory was substancialy modified in order to accomplish the extended analytical requirement of this project. For additional target compound added to the laboratory's regular target list, a separate GC was installed into the laboratory and new calibration standards were made.

Ketones are usually analyzed by using EPA Method 8015 in most environmental laboratories. In InterPhase's mobile laboratories, the target ketones of this project were detected and measured by the PID and confirmed by the FID. This procedure was in deed a combination of EPA Method 8020 and 8015.

Concentration of permanent gases in soil gas samples, including methane, were measured by another GC installed in the mobile laboratory for this project. The column used for this measurement was a 10 feet by 1/8" OD stainless steel, molacular sieve packed column manufactured by Supelco. The column was connected to a thermal conductivity detector (TCD), then to a flame ionization detector(FID). The use of FID in addition to TCD enabled the laboratory to lower the report limit to 0.001% (10ppmv). The analysis was performed isothermally at 55°C. The soil gas samples were introduced into the GC by direct syringe injection.

Two computers were used in the mobile laboratory to control the GCs and to collect data. Both computers were equipped with EZChrom chromatographic data system supplied by Scientific Software.

Gaseous standards were used for identification and quantitative measurement of target analytes. The calibration standards were prepared by InterPhase Environmental, Inc., according to a procedure that ensures maximum precision and accuracy.

Response Factors

External standard calibration method was used for this project. The computer-integration system calculates response factors (RF) as follows:

$$RF = C_d/A_d$$

where C_d = concentration of analyte in the calibration standard, µg/L
A_d = peak area of analyte from calibration run.

Response factors at different calibration levels are averaged to yield average response factors. The concentration of the unknown is determined by multiplying the peak area of the unknown by the average response factor.

$$C_p = (A_p)(\underline{RF})$$

where C_p = concentration of the analyte in sample in µg/L
$\underline{RF}$ = average response factor
A_p = peak area of analyte being measured

In this project the practical quantitation limits of reported detection was set at 1 microgram per liter (µg/L) for all compounds.

Decontamination of Equipment

Sampling equipment was decontaminated by methods consistent with the equipment's use. Polyethylene sample tubing was used for one sampling event and discarded. Reusable steel parts including adapters and point holders were cleaned by baking in an oven up to 180°C. Syringes were cleaned by heating up to 50°C in a custom made syringe cleaner under a clean nitrogen flow.

Separate storage areas were provided for used and cleaned equipment. The probe rod and drive points were stored in clean storage racks on the sampling rigs. Care was taken with the rods and points to eliminate both soil-surface and cross-hole contamination. No equipment that had been in contact with soil gas was used or reused without being decontaminated.

Standards

Neat reagent-grade compounds were used for preparation of stock liquid standards. The stock standard liquid mixture was prepared by adding the desired mass of each compound of interest to a capped vial. The mass added was weighed with an analytical balance. A measured volume of the stock liquid mixture was injected into a pre-evacuated six (6) liter Summa canister to prepare a calibration standard. The canister was filled with ultrahigh purity (UHP) grade nitrogen to bring the pressure to approximately 30 psig.

A separate gas standard mixture was prepared from a set of chemical reagents of different sources and used as a laboratory control standard (LCS). Also, a surrogate standard mixture was prepared by injecting two surrogate compounds (cis-1, 3-dichloropropene and 4-chlorotoluene) into a pre-evacuated Summa canister and filled up with UHP nitrogen.

For a calibration, different volumes of the standard gas mixture was injected into the gas chromatograph and analyzed to determine the response of the instrument.

Instrumentation

The make and model of the equipment used in the mobile laboratory to perform this soil gas survey project included:

Varian 3400 Gas Chromatograph;
AutoVOC™ Automated Gas Sample Injector;
Tracor 1000A Electrolytic Conductivity Detector (ELCD)
Tracor 703 Photoionization Detector (PID);
Varian Flame Ionization Detector (FID);
J&W Scientific DB-624, 30m Megabore Column;
J&W Scientific DB-1, 30m Megabore Column;
Scientific Software's EZChrom PC-Based Data System.

SRI 8610 Gas Chromatograph;
SRI Thermoconductivity Detector (TCD)
SRI Flame Ionization Detector (FID)
Supelco $^{1}/_{8}$" x 10' stainless steel column packed
w/ $^{60}/_{80}$ molecular sieve 5A

Quality Assurance / Quality Control

Quality control and quality assurance were achieved through strict laboratory protocol. An air blank was analyzed daily to demonstrate absence of interference in the analytical systems and surrounding atmosphere.

A five-point curve was generated for every target compound during the initial calibration of the gas chromatograph. To demonstrate the linearity of response, the percent relative standard deviation (%RSD) of at least 3 calibration points should be less than 20% for each target compounds except freons, chloroethane and vinyl chloride, for which %RSD should be less than 30%. The initial calibration was validated by analyzing the LCS sample. The allowed difference

between response factor of the LCS check and the response factor of the initial calibration was ±15% for all target compounds except for freons, chloroethane and vinyl chloride, for which ±25% was allowed. The calibration was acceptable if no more than 4 compounds exceeded the allowed percent difference between the calibration response factor and the LCS check response factor but none of them exceed 35%.

To validate use of an existing calibration curve, a mid-range calibration check was performed daily at the beginning of analysis (except the day when a multipoint calibration was performed). As required by the InterPhase QA/QC protocols, the percent relative standard deviation (%RSD) of the mid-point continuing calibration check should be less than 15% for all target compounds, except 25% for vinyl chloride, chloroethane, and Freon.

A fixed amount of surrogate standard was mixed with every sample. The surrogate was monitored for both retention time and percent recovery. The control limits for surrogate recovery were 100±25%.

Duplicate samples from at least 10% of the total samples were analyzed to measure the precision of sampling and analysis.

For non-standard target analytes, the quality control criteria may be different from those for standard target analytes.

Data Interpretation

Vapor-phase diffusion is the prevailing mechanism by which volatile organic contaminants are transported in deep subsurface soil. The concentration of a target analyte in a soil gas sample is a function of the phase, location and concentration of the source, physical properties of the analyte, and the media through which transport occurs. The site-specific variability among soil properties profoundly affect vapor-phase diffusion and must be considered in the interpretation of analyte distribution in the soil gas. Among these soil properties are: organic content, soil moisture, soil particle size and mineralogy, and air-filled porosity. Anomalies in the spatial distribution (vertically or laterally) of analyte concentrations in soil gas samples should be noted.

Although isoconcentration contours of soil gas data can be plotted on site maps, it should be emphasized that these isotherms are only representative of the contaminant distribution in soil vapor. Isoconcentration contours for compounds in soil or groundwater may be quite different from those of soil gas due to the spatial variation of the soil properties. Inherent assumptions that are infrequently applied to preparing soil concentration isotherms from soil gas data are:

- Soil gas concentration data are adequate to describe the spatial distribution of contaminants underlying the site;

- Vertical anisotropy is either insignificant or can be described by existing site data;
- Vapor barriers that may impede the gaseous diffusion of analytes are either nonexistent or do not vary over the investigation site;
- Soil texture, water content, and air-filled porosity are spatially uniform over the site.

When all these assumptions are true, the resulting soil concentration contour map is fairly reliable. But, any discrepancy of real condition from these assumptions may yield great difference from the actual soil concentration distribution.

In cases where data values in parts per million by volume (ppm_v) are desired, the conversion of soil gas concentrations from µg/L (gas) to ppm_v can be achieved with the following equation.

$$C_{ppm_v} = \frac{(C_{\mu g/L})(24.1)}{(mw)(P)}$$

Where;

C_{ppm_v}	soil gas concentration in ppm_v
$C_{\mu g/L}$	soil gas concentration in µg/L (gas)
24.1	molar volume at normal room temperature (70°F) in (L)(atm)/mole
mw	molecular weight in grams/mole
P	pressure in atmospheres (typically assumed to be 1 atm)

Using toluene, which has a molecular weight of 92.15, as an example: at normal temperature and one atmosphere of pressure, 1 µg/L of toluene would be equivalent to 0.26 ppm_v.

Results

The analytical instrument was calibrated for the basic suite of compounds on November 8, 1999. The result of this five-point calibration is presented in *Table 2. Initial Calibration Result.* %RSDs of response factors for all target compounds are within the control limits required by the QA/QC objectives. The calibration was verified by running a mid-concentration LCS sample after the calibration. The LCS check result is presented in *Table 3. LCS Check Result for Initial Calibration.* All checked results meet the QA/QC objectives.

A three point calibration was performed on December 6, 1999 by using a standard containing ketones and ethers. Three target compounds for this project: acetone, 2-butanone (methyl-isobutyl-ketone or MEK), and 4-methyl-2-pentanone (methyl-isobutyl-ketone, MIBK) were included in this standard. The calibration passed QA/QC requirement, and the results of this part of calibration are presented in *Table 4. Initial Calibration of Ketones and Ethers.* Because these compounds were not the regular target analytes LCS was not available for these compounds, hence check by LCS was not performed.

Calibration of methane and permanent gases (SRI gas chromatograph) was performed on December 7, 1999. Results of this calibration are presented in *Table 5. Initial Calibration of Methane and Permanent Gases.* LCS for this calibration was neither available and LCS check for this part of calibration was also omitted.

The left of this project's target compounds, chlorobenzene and 2-hexanone was not calibrated since the quantitative calibration standard of these two compounds were not available. The retention times for any of these two compounds was determined at the beginning of the project so that the instrument was able to detect and identify them. Since these two compounds were not detected in all soil gas samples, calibration of these two compounds was not necessary.

Table 6. Summary of Analytical Results presents the measured concentrations of all samples, blanks, and duplicates analyzed on site during this investigation. All samples collected and analyzed on December 7, 1999 and on December 8, 1999 were labeled as 99141_1 and 99141_2 respectively under Sample Delivery Group (SDG). Concentrations are reported in micrograms of contaminate per liter of soil gas (µg/L) for all target compounds except for methane concentration which is % volume to volume. The surrogate recoveries for three major detectors are also listed in this table. Surrogate recoveries for all samples are within the control limits (75% to 125%), except for sample 122-S01-058 and 122-S01-060, where the high concentration of analytes coelude with surrogates. These incidences are usually described as matrix interference.

Table 7. Daily Calibration Check Results presents the results of the continuing the calibration verification for the main suite of compounds of this project. The response factors of all checked compounds were within the control limits of ± 15% of initially calibrated response factors.

Table 2: Initial Calibration Results

Lab ID: Phase 17

INTERPHASE
ENVIRONMENTAL, INC

Date Calibrated: November 08, 1999
Analyst: David Feng
Standard: CAL9903
Date Standard Prepared: August 25, 1999
Concentration Level:
Amount of Standard Injected (mL):

				LEVEL 1 0.014			LEVEL 2 0.062			LEVEL 3 0.2		
Compound Name	***Detector***	***RT (min)***	***Stnd Conc. (ug/L)***	**Mass(ng)**	**Area**	**RF**	**Mass(ng)**	**Area**	**RF**	**Mass(ng)**	**Area**	**RF**
Dichlorodifluoromethane	ELCD	1.68	351	4.91	7926	6.20E-04	21.8	47597	4.57E-04	70.2	132266	5.31E-04
Vinyl Chloride	ELCD	2.16	349	4.89	12758	3.83E-04	21.6	72896	2.97E-04	69.8	215882	3.23E-04
Chloroethane	ELCD	2.80	361	5.05	5386	9.38E-04	22.4	34185	6.55E-04	72.2	101301	7.13E-04
Trichlorofluoromethane	ELCD	3.16	382	5.35	19727	2.71E-04	23.7	106290	2.23E-04	76.4	318184	2.40E-04
Dichloromethane	ELCD	4.36	354	4.96	14938	3.32E-04	21.9	72400	3.03E-04	70.8	223433	3.17E-04
trans-1,2-Dichloroethene	ELCD	4.69	352	4.93	16861	2.92E-04	21.8	79225	2.75E-04	70.4	247502	2.84E-04
1,1-Dichloroethane	ELCD	5.18	293	4.10	13334	3.08E-04	18.2	73209	2.48E-04	58.6	219750	2.67E-04
cis-1,2-Dichloroethene	ELCD	5.90	357	5.00	14655	3.41E-04	22.1	73401	3.02E-04	71.4	234578	3.04E-04
Chloroform	ELCD	6.33	352	4.93	19806	2.49E-04	21.8	98835	2.21E-04	70.4	312995	2.25E-04
1,1,1-Trichloroethane	ELCD	6.56	349	4.89	20797	2.35E-04	21.6	99609	2.17E-04	69.8	297965	2.34E-04
Carbon Tetrachloride	ELCD	6.80	350	4.90	26048	1.88E-04	21.7	120433	1.80E-04	70.0	362331	1.93E-04
1,2-Dichloroethane	ELCD	7.08	348	4.87	14048	3.47E-04	21.6	71914	3.00E-04	69.6	225307	3.09E-04
Trichloroethene	ELCD	8.04	350	4.90	16672	2.94E-04	21.7	73176	2.97E-04	70.0	254343	2.75E-04
1,1,2-Trichloroethane	ELCD	10.98	349	4.89	19893	2.46E-04	21.6	81900	2.64E-04	69.8	258520	2.70E-04
Tetrachloroethene	ELCD	11.26	369	5.17	21653	2.39E-04	22.9	85306	2.68E-04	73.8	280724	2.63E-04
1,1,1,2-Tetrachloroethane	ELCD	13.20	355	4.97	20058	2.48E-04	22.0	93716	2.35E-04	71.0	294673	2.41E-04
1,1,2,2-Tetrachloroethane	ELCD	15.58	351	4.91	16368	3.00E-04	21.8	87703	2.48E-04	70.2	249819	2.81E-04
1,1-Dichloroethene	PID	3.77	362	5.07	6751	7.51E-04	22.4	31897	7.04E-04	72.4	111726	6.48E-04
Benzene	PID	7.04	359	5.03	13403	3.75E-04	22.3	68131	3.27E-04	71.8	243584	2.95E-04
Toluene	PID	10.18	352	4.93	12843	3.84E-04	21.8	57605	3.79E-04	70.4	209071	3.37E-04
Ethyl Benzene	PID	13.28	351	4.91	10812	4.54E-04	21.8	51052	4.26E-04	70.2	188146	3.73E-04
m/p-Xylene	PID	13.54	707	9.90	28369	3.49E-04	43.8	129626	3.38E-04	141.4	465829	3.04E-04
o-Xylene	PID	14.39	353	4.94	11476	4.31E-04	21.9	52618	4.16E-04	70.6	190947	3.70E-04
1,1,2-Trichlorotrifluoroethane	FID	3.83	344	4.82	1690	2.85E-03	21.3	7964	2.68E-03	68.8	24803	2.77E-03

Table 2: Initial Calibration Results

Lab ID: Phase 17

INTERPHASE
ENVIRONMENTAL, INC

Date Calibrated: November 08, 1999
Analyst: David Feng
Standard: CAL9903
Date Standard Prepared: August 25, 1999
Concentration Level: LEVEL 4 / LEVEL 5
Amount of Standard Injected (mL): 0.5 / 0.95

Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (ug/L)*	Mass(ng)	Area	RF	Mass(ng)	Area	RF	Aver. RF	Std. Div.	%RSD	Acpt. Rng.
Dichlorodifluoromethane	ELCD	1.68	351	176	497937	3.52E-04	333	767890	4.34E-04	4.79E-04	1.01E-04	21.2	<30
Vinyl Chloride	ELCD	2.16	349	175	555757	3.14E-04	332	988494	3.35E-04	3.31E-04	3.25E-05	9.8	<30
Chloroethane	ELCD	2.80	361	181	349567	5.16E-04	343	555795	6.17E-04	6.88E-04	1.57E-04	22.9	<30
Trichlorofluoromethane	ELCD	3.16	382	191	778191	2.45E-04	363	1389993	2.61E-04	2.48E-04	1.88E-05	7.6	<30
Dichloromethane	ELCD	4.36	354	177	665728	2.66E-04	336	1108150	3.03E-04	3.04E-04	2.45E-05	8.0	<20
trans-1,2-Dichloroethene	ELCD	4.69	352	176	662552	2.66E-04	334	1159377	2.88E-04	2.81E-04	1.07E-05	3.8	<20
1,1-Dichloroethane	ELCD	5.18	293	147	547677	2.67E-04	278	991751	2.81E-04	2.74E-04	2.20E-05	8.0	<20
cis-1,2-Dichloroethene	ELCD	5.90	357	179	650079	2.75E-04	339	1132586	2.99E-04	3.04E-04	2.38E-05	7.8	<20
Chloroform	ELCD	6.33	352	176	788700	2.23E-04	334	1388659	2.41E-04	2.32E-04	1.24E-05	5.3	<20
1,1,1-Trichloroethane	ELCD	6.56	349	175	740539	2.36E-04	332	1307359	2.54E-04	2.35E-04	1.29E-05	5.5	<20
Carbon Tetrachloride	ELCD	6.80	350	175	877052	2.00E-04	333	1560510	2.13E-04	1.95E-04	1.24E-05	6.4	<20
1,2-Dichloroethane	ELCD	7.08	348	174	663442	2.62E-04	331	1120714	2.95E-04	3.03E-04	3.04E-05	10.0	<20
Trichloroethene	ELCD	8.04	350	175	747661	2.34E-04	333	1265547	2.63E-04	2.72E-04	2.56E-05	9.4	<20
1,1,2-Trichloroethane	ELCD	10.98	349	175	706570	2.47E-04	332	1337742	2.48E-04	2.55E-04	1.13E-05	4.4	<20
Tetrachloroethene	ELCD	11.26	369	185	786153	2.35E-04	351	1382012	2.54E-04	2.52E-04	1.47E-05	5.8	<20
1,1,1,2-Tetrachloroethane	ELCD	13.20	355	178	779708	2.28E-04	337	1485141	2.27E-04	2.36E-04	8.85E-06	3.8	<20
1,1,2,2-Tetrachloroethane	ELCD	15.58	351	176	659763	2.66E-04	333	1499843	2.22E-04	2.64E-04	3.00E-05	11.4	<20
1,1-Dichloroethene	PID	3.77	362	181	298930	6.05E-04	344	623004	5.52E-04	6.52E-04	7.84E-05	12.0	<20
Benzene	PID	7.04	359	180	643850	2.79E-04	341	1302897	2.62E-04	3.07E-04	4.47E-05	14.5	<20
Toluene	PID	10.18	352	176	580523	3.03E-04	334	1222147	2.74E-04	3.35E-04	4.76E-05	14.2	<20
Ethyl Benzene	PID	13.28	351	176	527091	3.33E-04	333	1149640	2.90E-04	3.75E-04	6.70E-05	17.8	<20
m/p-Xylene	PID	13.54	707	354	1298196	2.72E-04	672	2840390	2.36E-04	3.00E-04	4.65E-05	15.5	<20
o-Xylene	PID	14.39	353	177	549742	3.21E-04	335	1248354	2.69E-04	3.61E-04	6.72E-05	18.6	<20
1,1,2-Trichlorotrifluoroethane	FID	3.83	344	172	59231	2.90E-03	327	118020	2.77E-03	2.79E-03	8.61E-05	3.1	<30

Table 3: LCS Check Results

INTERPHASE
ENVIRONMENTAL, INC

Date Calibrated: November 8, 1999
Calibration Standard: CAL9903
LCS Standard: CAL9904
Date Standard Prepared: August 25, 1999
Analyst: David Feng
Date LCS Checked: 8-Nov-99
Time LCS Checked: 14:55
Volume of LCS Injected (mL): 0.2

Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (ug/L)*	Area	RF	Cal. Avr. RF	% Dev.	Acpt. Rng.
Dichlorodifluoromethane	ELCD	1.68	350	164866	4.25E-04	4.79E-04	-11.3	±25
Vinyl Chloride	ELCD	2.16	348	174261	3.99E-04	3.31E-04	20.8	±25
Chloroethane	ELCD	2.80	359	129083	5.56E-04	6.88E-04	-19.1	±25
Trichlorofluoromethane	ELCD	3.16	357	250785	2.85E-04	2.48E-04	14.7	±25
Dichloromethane	ELCD	4.36	351	224891	3.12E-04	3.04E-04	2.6	±15
trans-1,2-Dichloroethene	ELCD	4.69	359	236602	3.03E-04	2.81E-04	7.9	±15
1,1-Dichloroethane	ELCD	5.18	327	212487	3.08E-04	2.74E-04	12.3	±15
cis-1,2-Dichloroethene	ELCD	5.90	352	206413	3.41E-04	3.04E-04	12.1	±15
Chloroform	ELCD	6.33	350	316257	2.21E-04	2.32E-04	-4.5	±15
1,1,1-Trichloroethane	ELCD	6.56	353	312232	2.26E-04	2.35E-04	-3.8	±15
Carbon Tetrachloride	ELCD	6.80	348	381369	1.83E-04	1.95E-04	-6.3	±15
1,2-Dichloroethane	ELCD	7.08	350	231583	3.02E-04	3.03E-04	-0.1	±15
Trichloroethene	ELCD	8.04	345	249225	2.77E-04	2.72E-04	1.6	±15
1,1,2-Trichloroethane	ELCD	10.98	350	261702	2.67E-04	2.55E-04	4.9	±15
Tetrachloroethene	ELCD	11.26	348	301592	2.31E-04	2.52E-04	-8.3	±15
1,1,1,2-Tetrachloroethane	ELCD	13.20	351	282758	2.48E-04	2.36E-04	5.3	±15
1,1,2,2-Tetrachloroethane	ELCD	15.58	354	313749	2.26E-04	2.64E-04	-14.4	±15
1,1-Dichloroethene	PID	3.77	350	97407	7.19E-04	6.52E-04	10.2	±15
Benzene	PID	7.04	359	258025	2.78E-04	3.07E-04	-9.5	±15
Toluene	PID	10.18	349	239362	2.92E-04	3.35E-04	-13.0	±15
Ethyl Benzene	PID	13.28	350	213783	3.27E-04	3.75E-04	-12.8	±15
m/p-Xylene	PID	13.54	693	532908	2.60E-04	3.00E-04	-13.3	±15
o-Xylene	PID	14.39	345	213861	3.23E-04	3.61E-04	-10.7	±15
1,1,2-Trichlorotrifluoroethane	FID	3.83	350	22688	3.09E-03	2.79E-03	10.4	±25

INTERPHASE
ENVIRONMENTAL, INC

Table 4: Initial Calibration of Ketones and Ethers

Date Calibrated: December 06, 1999
Analyst: David Feng
Standard: CAL9901
Date Standard Prepared: March 11, 1999
Concentration Level:
Amount of Standard Injected (mL):

				LEVEL 1 0.062			LEVEL 2 0.2			LEVEL 3 1		
Compound Name	***Detector***	***RT (min)***	***Stnd Conc. (ug/L)***	**Mass(ng)**	**Area**	**RF**	**Mass(ng)**	**Area**	**RF**	**Mass(ng)**	**Area**	**RF**
Ethyl Ether	PID	4.29	378	23.44	29044	8.07E-04	75.6	105172	7.19E-04	378	567280	6.66E-04
Acetone	PID	4.63	418	25.92	50058	5.18E-04	83.6	169015	4.95E-04	418	941096	4.44E-04
MTBE	PID	5.60	391	24.24	34849	6.96E-04	78.2	121283	6.45E-04	391	654479	5.97E-04
MEK	PID	6.94	425	26.35	53917	4.89E-04	85.0	180414	4.71E-04	425	1049600	4.05E-04
MIBK	PID	11.23	423	26.23	32399	8.09E-04	84.6	150625	5.62E-04	423	776259	5.45E-04

INTERPHASE
ENVIRONMENTAL, INC

Table 4: Initial Calibration of Ketones and Ethers

Date Calibrated: December 06, 1999
Analyst: David Feng
Standard: CAL9901
Date Standard Prepared: March 11, 1999
Concentration Level:
Amount of Standard Injected (mL):

Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (ug/L)*	Aver. RF	Std. Div.	%RSD	Acpt. Rng.
Ethyl Ether	PID	4.29	378	7.31E-04	7.10E-05	9.7	<30
Acetone	PID	4.63	418	4.86E-04	3.76E-05	7.7	<30
MTBE	PID	5.60	391	6.46E-04	4.91E-05	7.6	<30
MEK	PID	6.94	425	4.55E-04	4.42E-05	9.7	<30
MIBK	PID	11.23	423	6.39E-04	1.48E-04	23.2	<30

Table 5: Initial Calibration of Methane and Permanent Gases

INTERPHASE
ENVIRONMENTAL, INC

Date Calibrated: December 07, 1999
Analyst: David Feng
Standard: Scott Mix 237
Standard Lot Number: 911002
Concentration Level:
Amount of Standard Injected (mL):

				LEVEL 1 0.01			LEVEL 2 0.05			LEVEL 3 0.2		
Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (%)*	Vol.(uL)	Area	RF	Vol.(uL)	Area	RF	Vol.(uL)	Area	RF
Methane	FID	1.68	4.5	0.45	402637	1.12E-06	2.25	2087706	1.08E-06	9.0	7059960	1.27E-06
Oxygen	TCD	2.16	7	0.70	8529	8.21E-05	3.5	40765	8.59E-05	14.0	137905	1.02E-04
Nitrogen	TCD	2.80	66.5	6.65	82989	8.01E-05	33.25	413263	8.05E-05	133.0	1373320	9.68E-05
Methane	TCD	3.16	4.5	0.45	2831	1.59E-04	2.25	22325	1.01E-04	9.0	83094	1.08E-04
Carbon Monoxide	TCD	4.36	7	0.70	8250	8.48E-05	3.5	41361	8.46E-05	14.0	105426	1.33E-04

INTERPHASE
ENVIRONMENTAL, INC

Table 5: Initial Calibration of Methane and Permanent Gases

Date Calibrated: December 07, 1999
Analyst: David Feng
Standard: Scott Mix 237
Standard Lot Number: 911002
Concentration Level: LEVEL 4
Amount of Standard Injected (mL): 0.5

Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (%)*	Vol.(uL)	Area	RF	Aver. RF	Std. Div.	%RSD	Acpt. Rng.
Methane	FID	1.68	4.5	22.5	18955096	1.19E-06	1.16E-06	8.64E-08	7.4	<30
Oxygen	TCD	2.16	7	35	375236	9.33E-05	9.07E-05	8.59E-06	9.5	<30
Nitrogen	TCD	2.80	66.5	333	3721696	8.93E-05	8.67E-05	8.00E-06	9.2	<30
Methane	TCD	3.16	4.5	22.5	217464	1.03E-04	1.18E-04	2.76E-05	23.4	<30
Carbon Monoxide	TCD	4.36	7	35	283954	1.23E-04	1.06E-04	2.53E-05	23.8	<30

Table 6: Analytical Results of Samples

Sample ID :			FIELD BLANK	B1	B2	B3	B4	B5	B6	B7	B8	B9	B9 REPL
SDG:			122-S01-112	122-S01-040	122-S01-042	122-S01-044	122-S01-046	122-S01-048	122-S01-050	122-S01-052	122-S01-054	122-S01-056	122-S01-100
Date Collected :			99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_1
Time Collected :			12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99
Date Analyzed :			8:07	9:05	9:30	9:50	10:20	10:40	11:10	11:20	11:55	12:05	12:05
Time Analyzed :			12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99
Volume Analyzed (ml) :			8:07	9:14	10:00	10:00	10:50	10:50	11:37	11:37	12:13	12:13	12:13
Compound Name	*Detector*	*RT (min)*	1	1	1	1	1	1	1	1	1	1	1
Dichlorodifluoromethane	ELCD	2.18	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ELCD	2.73	<1	<1	<1	<1	<1	<1	4.3	<1	<1	<1	<1
Chloroethane	ELCD	3.47	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ELCD	3.88	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ELCD	5.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ELCD	5.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ELCD	6.15	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ELCD	6.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ELCD	7.42	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ELCD	7.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ELCD	7.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ELCD	8.26	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ELCD	9.30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ELCD	12.38	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ELCD	12.70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ELCD	14.48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	ELCD	14.64	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ELCD	16.46	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	PID	4.56	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	PID	8.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	PID	1.58	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	PID	14.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m/p-Xylene	PID	14.91	<1	<1	<1	<1	<1	<1	1.3	<1	<1	<1	<1
o-Xylene	PID	15.53	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichlorotrifluoroethane	FID	4.54	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acetone	PID	4.63	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MEK	PID	6.94	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MIBK	PID	11.23	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	PID	12.94	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane	SRI/FID	4.84	NA	<0.001	<0.001	<0.001	0.002	<0.001	2.8	0.016	<0.001	29	28
% C13DCPE Recovery (ELCD)		10.96	88	89	91	95	93	95	97	90	95	90	92
% C13DCPE Recovery (PID)		10.93	92	94	93	95	94	92	97	94	93	94	95
% 4CLTOL Recovery (PID)		16.80	79	83	83	84	83	80	82	83	83	84	85
% C13DCPE Recovery (FID)		9.47	102	100	100	100	100	96	101	102	101	104	105
% 4CLTOL Recovery (FID)		16.14	83	87	86	88	87	85	86	87	87	89	90

Unit of Concentration % v/v for Methane and ug/L for the rest of target compounds. Unit of surrogate recoveries is %
NA -- Not Applicable, or Not Available
MI -- Matrix Interference
NOTE: Location information concealed until after data were reported.

Table 6: Analytical Results of Samples

Sample ID :			B10	B11	B12	B13	B14	B15	FIELD BLANK	B16	B17	B17 REPL	B18
SDG:			122-S01-058	122-S01-060	122-S01-062	122-S01-064	122-S01-066	122-S01-068	122-S01-113	122-S01-070	122-S01-072	122-S01-101	122-S01-74
Date Collected :			99141_1	99141_1	99141_1	99141_1	99141_1	99141_1	99141_2	99141_2	99141_2	99141_2	99141_2
Time Collected :			12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99
Date Analyzed :			14:10	14:50	15:00	15:50	16:08	16:35	8:14	8:40	8:56	8:56	9:30
Time Analyzed :			12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/7/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99
Volume Analyzed (ml) :			14:35	15:11	15:11	16:20	16:20	16:55	8:14	9:06	9:06	9:53	10:02
			1	1	1	1	1	1	1	1	1	1	1
Compound Name	*Detector*	*RT (min)*											
Dichlorodifluoromethane	ELCD	2.18	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ELCD	2.73	<1	34	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ELCD	3.47	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ELCD	3.88	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ELCD	5.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ELCD	5.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ELCD	6.15	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ELCD	6.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ELCD	7.42	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ELCD	7.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ELCD	7.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ELCD	8.26	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ELCD	9.30	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ELCD	12.38	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ELCD	12.70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ELCD	14.48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	ELCD	14.64	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ELCD	16.46	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	PID	4.56	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	PID	8.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	PID	1.58	1.7	5.9 Ja	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	PID	14.69	8.0	19 Ja	<1	<1	<1	<1	<1	<1	<1	<1	<1
m/p-Xylene	PID	14.91	14	27 Ja	<1	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	PID	15.53	11	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichlorotrifluoroethane	FID	4.54	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acetone	PID	4.63	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MEK	PID	6.94	<5	29 Ja	<5	<5	<5	<5	<5	<5	<5	<5	<5
MIBK	PID	11.23	<5	770 Ja	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	PID	12.94	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane	SRI/FID	4.84	4.1	4.5	0.020	0.26	<0.001	<0.001	<0.001	<0.001	0.014	NA	2.4
% C13DCPE Recovery (ELCD)		10.96	93	95	93	87	90	87	89	95	99	91	93
% C13DCPE Recovery (PID)		10.93	109	157(MI)	93	93	93	93	93	93	94	93	94
% 4CLTOL Recovery (PID)		16.80	86	85	80	80	83	82	82	83	82	81	83
% C13DCPE Recovery (FID)		9.47	516(MI)	837(MI)	102	108	102	101	102	100	99	102	105
% 4CLTOL Recovery (FID)		16.14	103	99	85	84	87	87	86	87	87	84	87

Unit of Concentration % w/v for Methane and ug/L for the rest of target compounds. Unit of surrogate recoveries is %
NA -- Not Applicable, or Not Available
MI -- Matrix Interference
NOTE: Location information concealed until after data were reported.

J--Estimated concentration
a--Surrogate recovery problem

Table 6: Analytical Results of Samples

			B19	B20	B21	B22	B23	B24	B25	B26	B27	B28	B29
Sample ID :			122-S01-76	122-S01-78	122-S01-80	122-S01-82	122-S01-84	122-S01-86	122-S01-88	122-S01-90	122-S01-92	122-S01-94	122-S01-96
SDG:			99141_2	99141_2	99141_2	99141_2	99141_2	99141_2	99141_2	99141_2	99141_2	99141_2	99141_2
Date Collected :			12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99
Time Collected :			9:55	10:25	10:37	11:08	11:15	11:51	12:00	12:20	12:30	13:15	1:30
Date Analyzed :			12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99	12/8/99
Time Analyzed :			10:02	10:46	10:46	11:36	11:36	12:08	12:08	12:41	12:41	13:42	13:42
Volume Analyzed (ml) :			1	1	1	1	1	1	1	1	1	1	1
Compound Name	***Detector***	***RT (min)***											
Dichlorodifluoromethane	ELCD	2.18	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ELCD	2.73	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ELCD	3.47	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ELCD	3.88	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	ELCD	5.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ELCD	5.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ELCD	6.15	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ELCD	6.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ELCD	7.42	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	ELCD	7.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ELCD	7.95	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ELCD	8.26	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ELCD	9.30	<1	<1	3.1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ELCD	12.38	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ELCD	12.70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ELCD	14.48	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	ELCD	14.64	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ELCD	16.46	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	PID	4.56	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzene	PID	8.23	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	PID	1.58	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethyl Benzene	PID	14.69	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m/p-Xylene	PID	14.91	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	PID	15.53	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichlorotrifluoroethane	FID	4.54	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acetone	PID	4.63	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MEK	PID	6.94	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MIBK	PID	11.23	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	PID	12.94	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane	SRI/FID	4.84	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.012	3.2	<0.001	0.011	0.71
% C13DCPE Recovery (ELCD)		10.96	92	92	93	94	89	93	92	91	91	95	95
% C13DCPE Recovery (PID)		10.93	93	93	95	93	94	93	95	93	94	95	95
% 4CLTOL Recovery (PID)		16.80	80	84	84	83	83	82	84	83	83	83	83
% C13DCPE Recovery (FID)		9.47	97	100	100	100	99	101	100	102	101	100	100
% 4CLTOL Recovery (FID)		16.14	84	87	88	87	87	87	88	86	88	87	87

Unit of Concentration % v/v for Methane and ug/L for the rest of target compounds. Unit of surrogate recoveries is %
NA -- Not Applicable, or Not Available
MI -- Matrix Interference
NOTE: Location information concealed until after data were reported.

Table 6: Analytical Results of Samples

			B30	B31	B31 REPL	FIELD BLANK
Sample ID :			122-S01-98	122-S01-99	122-S01-102	122-S01-114
SDG:			99141_2	99141_2	99141_2	99141_2
Date Collected :			12/8/99	12/8/99	12/8/99	12/8/99
Time Collected :			14:00	14:05	14:05	15:00
Date Analyzed :			12/8/99	12/8/99	12/8/99	12/8/99
Time Analyzed :			14:16	14:16	14:16	15:06
Volume Analyzed (ml) :			1	1	1	1
Compound Name	***Detector***	***RT (min)***				
Dichlorodifluoromethane	ELCD	2.18	<1	<1	<1	<1
Vinyl Chloride	ELCD	2.73	<1	<1	<1	<1
Chloroethane	ELCD	3.47	<1	<1	<1	<1
Trichlorofluoromethane	ELCD	3.88	<1	<1	<1	<1
Dichloromethane	ELCD	5.23	<1	<1	<1	<1
trans-1,2-Dichloroethene	ELCD	5.60	<1	<1	<1	<1
1,1-Dichloroethane	ELCD	6.15	<1	<1	<1	<1
cis-1,2-Dichloroethene	ELCD	6.95	<1	<1	<1	<1
Chloroform	ELCD	7.42	<1	<1	<1	<1
1,1,1-Trichloroethane	ELCD	7.69	<1	<1	<1	<1
Carbon Tetrachloride	ELCD	7.95	<1	<1	<1	<1
1,2-Dichloroethane	ELCD	8.26	<1	<1	<1	<1
Trichloroethene	ELCD	9.30	<1	<1	<1	<1
1,1,2-Trichloroethane	ELCD	12.38	<1	<1	<1	<1
Tetrachloroethene	ELCD	12.70	<1	<1	<1	<1
Chlorobenzene	ELCD	14.48	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	ELCD	14.64	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ELCD	16.46	<1	<1	<1	<1
1,1-Dichloroethene	PID	4.56	<1	<1	<1	<1
Benzene	PID	8.23	<1	<1	<1	<1
Toluene	PID	1.58	1.0	<1	<1	<1
Ethyl Benzene	PID	14.69	<1	<1	<1	<1
m/p-Xylene	PID	14.91	<1	<1	<1	<1
o-Xylene	PID	15.53	<1	<1	<1	<1
1,1,2-Trichlorotrifluoroethane	FID	4.54	<1	<1	<1	<1
Acetone	PID	4.63	<5	<5	<5	<5
MEK	PID	6.94	<5	<5	<5	<5
MIBK	PID	11.23	<5	<5	<5	<5
2-Hexanone	PID	12.94	<5	<5	<5	<5
Methane	SRI/FID	4.84	0.007	0.002	0.002	<0.001
% C13DCPE Recovery (ELCD)		10.96	102	97	93	92
% C13DCPE Recovery (PID)		10.93	95	91	93	92
% 4CLTOL Recovery (PID)		16.80	82	79	81	81
% C13DCPE Recovery (FID)		9.47	99	96	101	101
% 4CLTOL Recovery (FID)		16.14	87	84	86	85

Unit of Concentration % v/v for Methane and ug/L for the rest of target compounds. Unit of surrogate recoveries is %
NA -- Not Applicable, or Not Available
MI -- Matrix Interference
NOTE: Location information concealed until after data were reported.

Table 7: Daily Calibration Check Results

INTERPHASE
ENVIRONMENTAL, INC

Date Calibrated: November 8, 1999
Analyst: David Q Feng
Standard: CAL9903
Date Standard Prepared: August 25, 1999

Date Calibration Checked:	7-Dec-99	8-Dec-99
Time Calibration Checked:	8:28	8:35
Volume of Stndard Injected (mL):	0.2	0.2

Compound Name	*Detector*	*RT (min)*	*Stnd Conc. (ug/L)*	*Cald. RF*	Area	RF	% Dev.	Acpt. Rng.	Area	RF	% Dev.	Acpt. Rng.
Dichlorodifluoromethane	ELCD	2.18	351	4.79E-04	189273	3.71E-04	-22.6	±25	183947	3.82E-04	-20.3	±25
Vinyl Chloride	ELCD	2.73	349	3.31E-04	212612	3.28E-04	-0.7	±25	204285	3.42E-04	3.4	±25
Chloroethane	ELCD	3.47	361	6.88E-04	137240	5.26E-04	-23.5	±25	140652	5.13E-04	-25.4	±25
Trichlorofluoromethane	ELCD	3.88	382	2.48E-04	301822	2.53E-04	2.0	±25	303811	2.51E-04	1.4	±25
Dichloromethane	ELCD	5.23	354	3.04E-04	261605	2.71E-04	-11.0	±15	269603	2.63E-04	-13.7	±15
trans-1,2-Dichloroethene	ELCD	5.60	352	2.81E-04	254505	2.77E-04	-1.6	±15	262683	2.68E-04	-4.7	±15
1,1-Dichloroethane	ELCD	6.15	293	2.74E-04	211135	2.78E-04	1.3	±15	206662	2.84E-04	3.4	±15
cis-1,2-Dichloroethene	ELCD	6.95	357	3.04E-04	246285	2.90E-04	-4.7	±15	259545	2.75E-04	-9.6	±15
Chloroform	ELCD	7.42	352	2.32E-04	307730	2.29E-04	-1.3	±15	315679	2.23E-04	-3.8	±15
1,1,1-Trichloroethane	ELCD	7.69	349	2.35E-04	286814	2.43E-04	3.5	±15	291942	2.39E-04	1.7	±15
Carbon Tetrachloride	ELCD	7.95	350	1.95E-04	338678	2.07E-04	6.1	±15	344776	2.03E-04	4.2	±15
1,2-Dichloroethane	ELCD	8.26	348	3.03E-04	264532	2.63E-04	-13.1	±15	268603	2.59E-04	-14.4	±15
Trichloroethene	ELCD	9.30	350	2.72E-04	274472	2.55E-04	-6.4	±15	290401	2.41E-04	-11.5	±15
1,1,2-Trichloroethane	ELCD	12.38	349	2.55E-04	261740	2.67E-04	4.6	±15	283865	2.46E-04	-3.5	±15
Tetrachloroethene	ELCD	12.70	369	2.52E-04	308317	2.39E-04	-4.9	±15	333444	2.21E-04	-12.0	±15
1,1,1,2-Tetrachloroethane	ELCD	14.64	355	2.36E-04	284405	2.50E-04	5.9	±15	305590	2.32E-04	-1.4	±15
1,1,2,2-Tetrachloroethane	ELCD	16.46	351	2.64E-04	233181	3.01E-04	14.2	±15	279562	2.51E-04	-4.7	±15
1,1-Dichloroethene	PID	4.56	362	6.52E-04	111897	6.47E-04	-0.8	±15	112336	6.44E-04	-1.1	±15
Benzene	PID	8.23	359	3.07E-04	246476	2.91E-04	-5.2	±15	251527	2.85E-04	-7.1	±15
Toluene	PID	1.58	352	3.35E-04	210181	3.35E-04	-0.1	±15	222640	3.16E-04	-5.7	±15
Ethyl Benzene	PID	14.69	351	3.75E-04	185479	3.78E-04	0.8	±15	203750	3.45E-04	-8.2	±15
m/p-Xylene	PID	14.91	707	3.00E-04	461971	3.06E-04	2.1	±15	514198	2.75E-04	-8.3	±15
o-Xylene	PID	15.53	353	3.61E-04	190346	3.71E-04	2.7	±25	213624	3.30E-04	-8.5	±25
1,1,2-Trichlorotrifluoroethane	FID	4.54	344	2.79E-03	31722	2.17E-03	-22.4	±25	28693	2.40E-03	-14.2	±25

Client Name: CE SCHMIDT
Project #: 99141

Alameda Point
Alameda, CA

APPENDIX D

Project : ALAMEDA CTO 122
Laboratory : Air Toxics Ltd.

A-TO14 ANALYSIS

Matrix : AIR

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-039 (PPBV)			122-S01-045 (PPBV)			122-S01-047 (PPBV)			122-S01-049 (PPBV)			122-S01-055 (PPBV)		
Sample Location	SG-S01-B1-0			SG-S01-B4-0			SG-S01-B5-0			SG-S04-B6-0			SG-S01-B9-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/14/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2,2-TETRACHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2-TRICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2,4-TRICHLOROBENZENE	0.140	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f
1,2,4-TRIMETHYLBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.180		
1,2-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROPROPANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3,5-TRIMETHYLBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3-BUTADIENE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
1,3-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DIOXANE (P-DIOXANE)	1.100			0.670	U		0.880			0.660	U		0.640	U	
2-BUTANONE	0.680	U		0.870	UJ	b	1.700	UJ	b	0.660	U		0.640	U	
2-HEXANONE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
2-PROPANOL	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
4-ETHYLTOLUENE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
4-METHYL-2-PENTANONE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
ACETONE	2.900	UJ	b	5.600			10.000			1.800	UJ	b	1.300	UJ	b
BENZENE	0.320	UJ	b	0.130	U		0.340	UJ	b	0.130	UJ	b	0.730	UJ	b
BROMODICHLOROMETHANE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
BROMOFORM	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
BROMOMETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CARBON DISULFIDE	0.680	U		0.670	U		0.980			0.660	U		0.640	U	
CARBON TETRACHLORIDE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROFORM	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROMETHANE	0.380	UJ	b	0.130	U		0.350	UJ	b	0.150	UJ	b,d	0.330	UJ	b
CHLOROTOLUENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CIS-1,2-DICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-039 (PPBV)			122-S01-045 (PPBV)			122-S01-047 (PPBV)			122-S01-049 (PPBV)			122-S01-055 (PPBV)		
Sample Location	SG-S01-B1-0			SG-S01-B4-0			SG-S01-B5-0			SG-S04-B6-0			SG-S01-B9-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/14/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
CIS-1,3-DICHLOROPROPENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
CYCLOHEXANE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
DIBROMOCHLOROMETHANE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
ETHANOL	1.500	UJ	b	1.300	UJ	b	2.000	UJ	b	0.960	UJ	b	2.400	UJ	b
ETHYLBENZENE	0.140	U		0.130	U		0.130	U		0.130	U		0.170		
ETHYLENE DIBROMIDE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 11	0.140	U		0.130	U		0.130	UJ	b	0.130	U		0.150	UJ	b
FREON 113	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 114	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 12	0.250	UJ	b	0.130	U		0.400	UJ	b	0.130	U		0.460	UJ	b
HEPTANE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
HEXACHLOROBUTADIENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
HEXANE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
M,P-XYLENE	0.280	UJ	b	0.130	U		0.130	U		0.130	U		0.610	UJ	b
METHYL TERT-BUTYL ETHER	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
METHYLENE CHLORIDE	0.140	U		0.130	U		0.150	UJ	b	0.130	U		0.220	UJ	b
O-XYLENE	0.140	U		0.130	U		0.130	U		0.130	U		0.220		
PROPYLENE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
STYRENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRACHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRAHYDROFURAN	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
TOLUENE	1.100	UJ	b	0.180	UJ	b	0.480	UJ	b	0.140	UJ	b	1.700	UJ	b
TRANS-1,2-DICHLOROETHENE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
TRANS-1,3-DICHLOROPROPENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
TRICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	
VINYL ACETATE	0.680	U		0.670	U		0.670	U		0.660	U		0.640	U	
VINYL CHLORIDE	0.140	U		0.130	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-056D (PPBV)			122-S01-058D (PPBV)			122-S01-059 (PPBV)			122-S01-061 (PPBV)			122-S01-068D (PPBV)		
Sample Location	SG-S01-B9-3			SG-S01-B10-3			SG-S01-B11-0			SG-S01-B12-0			SG-S01-B15-3		
Sample Depth (ft)	4.00 - 4.00			4.00 - 4.00			0.00 - 0.00			0.00 - 0.00			4.00 - 4.00		
Date Sampled / SDG Number	12/07/99 AAA01			12/07/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/07/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,1,2,2-TETRACHLOROETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,1,2-TRICHLOROETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,1-DICHLOROETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,1-DICHLOROETHENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,2,4-TRICHLOROBENZENE	4.500	UJ	f	480.000	UJ	f	0.130	UJ	f	0.130	UJ	f	0.960	U	
1,2,4-TRIMETHYLBENZENE	11.000	J	a	940.000			0.130	U		0.130	U		22.000	UJ	f
1,2-DICHLOROBENZENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,2-DICHLOROETHANE	4.500	U		480.000	U		0.610			0.130	U		0.960	U	
1,2-DICHLOROPROPANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,3,5-TRIMETHYLBENZENE	4.500	U		480.000	U		0.130	U		0.130	U		6.500		
1,3-BUTADIENE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
1,3-DICHLOROBENZENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,4-DICHLOROBENZENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
1,4-DIOXANE (P-DIOXANE)	22.000	U		2400.000	U		1.400			0.640	U		4.800	U	
2-BUTANONE	22.000	U		2400.000	U		0.660	U		0.720	UJ	b	4.800	U	
2-HEXANONE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
2-PROPANOL	22.000	U		11000.000			0.660	U		0.640	U		4.800	U	
4-ETHYLTOLUENE	22.000	U		2400.000	U		0.660	U		0.640	U		8.600		
4-METHYL-2-PENTANONE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
ACETONE	24.000	UJ	a,b	2400.000	U		3.900			9.400			100.000		
BENZENE	44.000	J	a	1300.000			0.850	UJ	b	0.900	UJ	b	5.200		
BROMODICHLOROMETHANE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
BROMOFORM	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
BROMOMETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
CARBON DISULFIDE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
CARBON TETRACHLORIDE	4.500	U		480.000	U		0.180			0.130	U		0.960	U	
CHLOROBENZENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
CHLOROETHANE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
CHLOROFORM	4.500	U		480.000	U		0.350			0.340			0.960	U	
CHLOROMETHANE	4.500	U		480.000	U		1.200	UJ	b	0.780	UJ	b	1.300	UJ	b
CHLOROTOLUENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
CIS-1,2-DICHLOROETHENE	17.000	J	a	480.000	U		0.130	U		0.130	U		0.960	U	

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
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Note :

TtEMI Sample ID / Units	122-S01-056D (PPBV)			122-S01-058D (PPBV)			122-S01-059 (PPBV)			122-S01-061 (PPBV)			122-S01-068D (PPBV)		
Sample Location	SG-S01-B9-3			SG-S01-B10-3			SG-S01-B11-0			SG-S01-B12-0			SG-S01-B15-3		
Sample Depth (ft)	4.00 - 4.00			4.00 - 4.00			0.00 - 0.00			0.00 - 0.00			4.00 - 4.00		
Date Sampled / SDG Number	12/07/99 AAA01			12/07/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/07/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
CIS-1,3-DICHLOROPROPENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
CYCLOHEXANE	210.000	J	a	2400.000	U		0.660	U		0.640	U		4.800	U	
DIBROMOCHLOROMETHANE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
ETHANOL	22.000	U		2400.000	U		0.920	UJ	b	0.740			4.800	U	
ETHYLBENZENE	11.000	J	a	890.000			0.130	U		0.130	U		9.200		
ETHYLENE DIBROMIDE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
FREON 11	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
FREON 113	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
FREON 114	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
FREON 12	4.500	U		480.000	U		0.130	U		0.260			0.960	U	
HEPTANE	22.000	U		51000.000			0.660	U		0.640	U		210.000		
HEXACHLOROBUTADIENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
HEXANE	70.000	J	a	8900.000			0.660	U		0.640	U		20.000		
M,P-XYLENE	26.000	J	a	1400.000			0.130	U		0.130	U		20.000		
METHYL TERT-BUTYL ETHER	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
METHYLENE CHLORIDE	4.500	U		2500.000			0.160	UJ	b	0.130			0.960	U	
O-XYLENE	11.000	J	a	660.000			0.130	U		0.130	U		8.900		
PROPYLENE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
STYRENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
TETRACHLOROETHENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
TETRAHYDROFURAN	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
TOLUENE	49.000	UJ	a,b	1200.000	UJ	b	0.130	U		0.170			18.000		
TRANS-1,2-DICHLOROETHENE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
TRANS-1,3-DICHLOROPROPENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
TRICHLOROETHENE	4.500	U		480.000	U		0.130	U		0.130	U		0.960	U	
VINYL ACETATE	22.000	U		2400.000	U		0.660	U		0.640	U		4.800	U	
VINYL CHLORIDE	580.000	J	a	480.000	U		0.130	U		0.130	U		0.960	U	

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
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k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
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Note :

A-TO14 ANALYSIS

Project : ALAMEDA CTO 122
Laboratory : Air Toxics Ltd.

Matrix : AIR

Date: 02/29/00

TtEMI Sample ID / Units	122-S01-071 (PPBV)			122-S01-077 (PPBV)			122-S01-079 (PPBV)			122-S01-085 (PPBV)			122-S01-089 (PPBV)		
Sample Location	SG-S01-B17-0			SG-S01-B20-0			SG-S01-B21-0			SG-S01-B24-0			SG-S01-B26-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/14/99			/ / 12/14/99			/ / 12/14/99			/ / 12/19/99			/ / 12/19/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2,2-TETRACHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2-TRICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2,4-TRICHLOROBENZENE	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f
1,2,4-TRIMETHYLBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	UJ	f	0.130	UJ	f
1,2-DICHLOROPROPANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3,5-TRIMETHYLBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3-BUTADIENE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
1,3-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DIOXANE (P-DIOXANE)	0.660	U		0.900			0.660	U		0.660	U		0.650	U	
2-BUTANONE	0.660	U		0.660	U		2.900	UJ	b	1.800	UJ	b	0.650	U	
2-HEXANONE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
2-PROPANOL	0.660	U		0.660	U		15.000			0.660	U		0.650	U	
4-ETHYLTOLUENE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
4-METHYL-2-PENTANONE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
ACETONE	2.000	UJ	b	3.000	UJ	b	42.000			9.600			2.400	UJ	b
BENZENE	0.130	U		0.130	U		0.640	UJ	b	0.210	UJ	b	0.150	UJ	b
BROMODICHLOROMETHANE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
BROMOFORM	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
BROMOMETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CARBON DISULFIDE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
CARBON TETRACHLORIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROETHANE	0.130	U		0.130	U		0.650			0.130	U		0.130	U	
CHLOROFORM	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROMETHANE	0.130	U		0.130	U		5.100			0.240	UJ	b	0.280	UJ	b
CHLOROTOLUENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CIS-1,2-DICHLOROETHENE	0.130	U		0.130	U		2.300			0.130	U		0.130	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-071 (PPBV)			122-S01-077 (PPBV)			122-S01-079 (PPBV)			122-S01-085 (PPBV)			122-S01-089 (PPBV)		
Sample Location	SG-S01-B17-0			SG-S01-B20-0			SG-S01-B21-0			SG-S01-B24-0			SG-S01-B26-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/14/99			/ / 12/14/99			/ / 12/14/99			/ / 12/19/99			/ / 12/19/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
CIS-1,3-DICHLOROPROPENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CYCLOHEXANE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
DIBROMOCHLOROMETHANE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
ETHANOL	1.200	UJ	b	1.900	UJ	b	12.000			0.920	UJ	b	0.650	U	
ETHYLBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
ETHYLENE DIBROMIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 11	0.130	U		0.130	U		0.130	U		0.190	UJ	b	0.130	U	
FREON 113	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 114	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 12	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
HEPTANE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
HEXACHLOROBUTADIENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
HEXANE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
M,P-XYLENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
METHYL TERT-BUTYL ETHER	0.660	U		0.660	U		0.850			1.000			0.650	U	
METHYLENE CHLORIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
O-XYLENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
PROPYLENE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
STYRENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRACHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRAHYDROFURAN	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
TOLUENE	0.130	U		0.130	U		0.700	UJ	b	0.520	UJ	b	0.380	UJ	b
TRANS-1,2-DICHLOROETHENE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
TRANS-1,3-DICHLOROPROPENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TRICHLOROETHENE	0.130	U		0.130	U		2.800			0.130	U		0.130	U	
VINYL ACETATE	0.660	U		0.660	U		0.660	U		0.660	U		0.650	U	
VINYL CHLORIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
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c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-093 (PPBV)			122-S01-095 (PPBV)			122-S01-099A (PPBV)			122-S01-103 (PPBV)			122-S01-104 (PPBV)		
Sample Location	SG-S01-B28-0			SG-S01-B29-0			SG-S01-B31-0			SG-S01-B9-0-D			SG-S01-B11-0-D		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/19/99			/ / 12/19/99			/ / 12/19/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2,2-TETRACHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1,2-TRICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2,4-TRICHLOROBENZENE	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f
1,2,4-TRIMETHYLBENZENE	0.130	U		0.130	U		0.130	U		0.150			0.150		
1,2-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROETHANE	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	U		0.130	U	
1,2-DICHLOROPROPANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3,5-TRIMETHYLBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,3-BUTADIENE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
1,3-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DICHLOROBENZENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
1,4-DIOXANE (P-DIOXANE)	1.400			1.900			0.650	U		0.640	U		0.650	U	
2-BUTANONE	0.650	U		1.200	UJ	b	0.880	UJ	b	0.640	U		0.970	UJ	b
2-HEXANONE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
2-PROPANOL	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
4-ETHYLTOLUENE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
4-METHYL-2-PENTANONE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
ACETONE	7.500			6.800			5.200			2.000	UJ	b	6.000		
BENZENE	0.340	UJ	b	0.470	UJ	b	0.510	UJ	b	0.660	UJ	b	0.130	U	
BROMODICHLOROMETHANE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
BROMOFORM	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
BROMOMETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CARBON DISULFIDE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
CARBON TETRACHLORIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROBENZENE	0.130	U		0.130	U		0.230			0.130	U		0.130	U	
CHLOROETHANE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROFORM	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CHLOROMETHANE	0.380	UJ	b	0.670	UJ	b	0.480	UJ	b	0.240			0.130	U	
CHLOROTOLUENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CIS-1,2-DICHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
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y - Resembles a fuel pattern but does not match the standard
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Note :

TtEMI Sample ID / Units	122-S01-093 (PPBV)			122-S01-095 (PPBV)			122-S01-099A (PPBV)			122-S01-103 (PPBV)			122-S01-104 (PPBV)		
Sample Location	SG-S01-B28-0			SG-S01-B29-0			SG-S01-B31-0			SG-S01-B9-0-D			SG-S01-B11-0-D		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/19/99			/ / 12/19/99			/ / 12/19/99			/ / 12/13/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
CIS-1,3-DICHLOROPROPENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
CYCLOHEXANE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
DIBROMOCHLOROMETHANE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
ETHANOL	0.650	U		2.200	UJ	b	0.650	U		25.000	UJ	b	1.400	UJ	b
ETHYLBENZENE	0.130	U		0.260			0.170			0.150			0.130	U	
ETHYLENE DIBROMIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 11	0.170	UJ	b	0.300	UJ	b	0.160	UJ	b	0.130	U		0.130	U	
FREON 113	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 114	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
FREON 12	0.360	UJ	b	0.690	UJ	b	0.380	UJ	b	0.380	UJ	b	0.130	U	
HEPTANE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
HEXACHLOROBUTADIENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
HEXANE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
M,P-XYLENE	0.130	U		0.280	UJ	b	0.180	UJ	b	0.560	UJ	b	0.240	UJ	b
METHYL TERT-BUTYL ETHER	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
METHYLENE CHLORIDE	0.130	U		0.200	UJ	b	0.130	UJ	b	0.160	UJ	b	0.130	U	
O-XYLENE	0.130	U		0.130	U		0.130	U		0.190			0.130	U	
PROPYLENE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
STYRENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRACHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TETRAHYDROFURAN	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
TOLUENE	0.730	UJ	b	1.100	UJ	b	0.670	UJ	b	1.500	UJ	b	0.220	UJ	b
TRANS-1,2-DICHLOROETHENE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
TRANS-1,3-DICHLOROPROPENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
TRICHLOROETHENE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	
VINYL ACETATE	0.650	U		0.670	U		0.650	U		0.640	U		0.650	U	
VINYL CHLORIDE	0.130	U		0.130	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
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Applicable Comments (Com):
a - Surrogate recovery problem
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h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-115 (PPBV)			122-S01-116 (PPBV)			122-S01-117 (PPBV)			122-S01-151 (PPBV)		
Sample Location	FIELD BLANK			FIELD BLANK			BACKGROUND SAMPLE			SG-S04-B11-C		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/07/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/19/99			/ / 12/19/99			/ / 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
1,1,1-TRICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
1,1,2,2-TETRACHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
1,1,2-TRICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
1,1-DICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U	
1,2,4-TRICHLOROBENZENE	0.140	UJ	f	0.130	UJ	f	0.130	UJ	f	0.130	UJ	f
1,2,4-TRIMETHYLBENZENE	0.140	U		0.130	U		0.130	U		1.500		
1,2-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U	
1,2-DICHLOROETHANE	0.140	U		0.130	UJ	f	0.130	UJ	f	0.130	U	
1,2-DICHLOROPROPANE	0.140	U		0.130	U		0.130	U		0.130	U	
1,3,5-TRIMETHYLBENZENE	0.140	U		0.130	U		0.130	U		0.640		
1,3-BUTADIENE	0.680	U		0.650	U		0.640	U		0.650	U	
1,3-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U	
1,4-DICHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U	
1,4-DIOXANE (P-DIOXANE)	0.720			0.650	U		0.640	U		1.500		
2-BUTANONE	0.680	U		0.650	U		0.640	U		0.650	U	
2-HEXANONE	0.680	U		0.650	U		0.640	U		0.650	U	
2-PROPANOL	0.680	U		0.650	U		0.640	U		0.650	U	
4-ETHYLTOLUENE	0.680	U		0.650	U		0.640	U		0.650	U	
4-METHYL-2-PENTANONE	0.680	U		0.650	U		0.640	U		0.650	U	
ACETONE	2.600	UJ	b	1.100	UJ	b	1.200	UJ	b	1.900	UJ	b
BENZENE	0.140	U		0.130	U		0.250			0.130	U	
BROMODICHLOROMETHANE	0.680	U		0.650	U		0.640	U		0.650	U	
BROMOFORM	0.680	U		0.650	U		0.640	U		0.650	U	
BROMOMETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
CARBON DISULFIDE	0.680	U		0.650	U		0.640	U		0.650	U	
CARBON TETRACHLORIDE	0.140	U		0.130	U		0.130	U		0.130	U	
CHLOROBENZENE	0.140	U		0.130	U		0.130	U		0.130	U	
CHLOROETHANE	0.140	U		0.130	U		0.130	U		0.130	U	
CHLOROFORM	0.140	U		0.130	U		0.130	U		0.480		
CHLOROMETHANE	0.300			0.130	U		0.320			0.480	UJ	b
CHLOROTOLUENE	0.140	U		0.130	U		0.130	U		0.130	U	
CIS-1,2-DICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
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Applicable Comments (Com):
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Note :

Project : ALAMEDA CTO 122
Laboratory : Air Toxics Ltd.

A-TO14 ANALYSIS

Matrix : AIR

TtEMI Sample ID / Units	122-S01-115 (PPBV)			122-S01-116 (PPBV)			122-S01-117 (PPBV)			122-S01-151 (PPBV)		
Sample Location	FIELD BLANK			FIELD BLANK			BACKGROUND SAMPLE			SG-S04-B11-C		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/07/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/19/99			/ / 12/19/99			/ / 12/14/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
CIS-1,3-DICHLOROPROPENE	0.140	U		0.130	U		0.130	U		0.130	U	
CYCLOHEXANE	0.680	U		0.650	U		0.640	U		0.650	U	
DIBROMOCHLOROMETHANE	0.680	U		0.650	U		0.640	U		0.650	U	
ETHANOL	1.000			0.650	U		7.400	UJ	b	0.930		
ETHYLBENZENE	0.140	U		0.130	U		0.130	U		0.130	U	
ETHYLENE DIBROMIDE	0.140	U		0.130	U		0.130	U		0.130	U	
FREON 11	0.140	U		0.130	U		0.200			0.130	U	
FREON 113	0.140	U		0.130	U		0.130	U		0.130	U	
FREON 114	0.140	U		0.130	U		0.130	U		0.130	U	
FREON 12	0.140	U		0.130	U		0.490			0.130	U	
HEPTANE	0.680	U		0.650	U		0.640	U		0.650	U	
HEXACHLOROBUTADIENE	0.140	U		0.130	U		0.130	U		0.130	U	
HEXANE	0.680	U		0.650	U		0.640	U		0.650	U	
M,P-XYLENE	0.140	U		0.130	U		0.190	UJ	b	0.540		
METHYL TERT-BUTYL ETHER	0.680	U		0.650	U		0.640	U		0.650	U	
METHYLENE CHLORIDE	0.140	U		0.130	U		0.140	UJ	b	0.130	U	
O-XYLENE	0.140	U		0.130	U		0.130	U		0.130	U	
PROPYLENE	0.680	U		0.650	U		0.640	U		0.650	U	
STYRENE	0.140	U		0.130	U		0.130	U		0.130	U	
TETRACHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U	
TETRAHYDROFURAN	0.680	U		0.650	U		0.640	U		0.650	U	
TOLUENE	0.490			0.130	U		0.670			0.380	UJ	b
TRANS-1,2-DICHLOROETHENE	0.680	U		0.650	U		0.640	U		0.650	U	
TRANS-1,3-DICHLOROPROPENE	0.140	U		0.130	U		0.130	U		0.130	U	
TRICHLOROETHENE	0.140	U		0.130	U		0.130	U		0.130	U	
VINYL ACETATE	0.680	U		0.650	U		0.640	U		0.650	U	
VINYL CHLORIDE	0.140	U		0.130	U		0.130	U		0.130	U	

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-039 (PPBV)			122-S01-045 (PPBV)			122-S01-047 (PPBV)			122-S01-049 (PPBV)			122-S01-055 (PPBV)		
Sample Location	SG-S01-B1-0			SG-S01-B4-0			SG-S01-B5-0			SG-S04-B6-0			SG-S01-B9-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/12/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
METHANE	14000.000	UJ	f	13000.000	UJ	f	13000.000	UJ	f	13000.000	UJ	f	13000.000	U	

TtEMI Sample ID / Units	122-S01-056D (PPBV)			122-S01-058D (PPBV)			122-S01-059 (PPBV)			122-S01-061 (PPBV)			122-S01-068D (PPBV)		
Sample Location	SG-S01-B9-3			SG-S01-B10-3			SG-S01-B11-0			SG-S01-B12-0			SG-S01-B15-3		
Sample Depth (ft)	4.00 - 4.00			4.00 - 4.00			0.00 - 0.00			0.00 - 0.00			4.00 - 4.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/12/99			/ / 12/12/99			/ / 12/12/99			/ / 12/12/99			/ / 12/12/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
METHANE	500000000.00	J	f	42000000.000	J	f	13000.000	UJ	f	13000.000	UJ	f	510000000.00	J	f

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z - Unknown peaks, not a fuel pattern

Note :

TtEMI Sample ID / Units	122-S01-071 (PPBV)			122-S01-077 (PPBV)			122-S01-079 (PPBV)			122-S01-085 (PPBV)			122-S01-089 (PPBV)		
Sample Location	SG-S01-B17-0			SG-S01-B20-0			SG-S01-B21-0			SG-S01-B24-0			SG-S01-B26-0		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/13/99			/ / 12/16/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
METHANE	13000.000	UJ	f	13000.000	UJ	f	13000.000	UJ	f	13000.000	UJ	f	13000.000	U	

TtEMI Sample ID / Units	122-S01-093 (PPBV)			122-S01-095 (PPBV)			122-S01-099A (PPBV)			122-S01-103 (PPBV)			122-S01-104 (PPBV)		
Sample Location	SG-S01-B28-0			SG-S01-B29-0			SG-S01-B31-0			SG-S01-B9-0-D			SG-S01-B11-0-D		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/16/99			/ / 12/16/99			/ / 12/16/99			/ / 12/12/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
METHANE	13000.000	U		13000.000	U		13000.000	U		13000.000	UJ	f	13000.000	UJ	f

Validity (Val):
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R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
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b - Blank contamination problems
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h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

Project : ALAMEDA CTO 122
Laboratory : Air Toxics Ltd.

Matrix : AIR

TtEMI Sample ID / Units	122-S01-115 (PPBV)			122-S01-116 (PPBV)			122-S01-117 (PPBV)			122-S01-151 (PPBV)		
Sample Location	FIELD BLANK			FIELD BLANK			BACKGROUND SAMPLE			SG-S04-B11-C		
Sample Depth (ft)	0.00 - 0.00			0.00 - 0.00			0.00 - 0.00			0.00 - 0.00		
Date Sampled / SDG Number	12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01			12/08/99 AAA01		
Date Extracted / Analyzed	/ / 12/12/99			/ / 12/16/99			/ / 12/16/99			/ / 12/13/99		
Analyte	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
METHANE	14000.000	UJ	f	13000.000	U		13000.000	U		13000.000	UJ	f

Validity (Val):
U - Non-detected
UJ - Non-detected estimated
R - Rejected
J - Estimated concentration

NA - Not Analyzed

Applicable Comments (Com):
a - Surrogate recovery problem
b - Blank contamination problems
c - Matrix spike recovery problems
d - Duplicate (precision) problems
e - Internal standard problems
f - Calibration problems
g - Quantification below reporting limit
h - Other problems, refer to data validation narrative
k - Holding time exceeded
p - >25%D between columns
y - Resembles a fuel pattern but does not match the standard
z - Unknown peaks, not a fuel pattern

Note :

APPENDIX E

C. E. SCHMIDT, Ph. D
Environmental Consultant

TECHNICAL MEMORANDUM

Results of the Landfill Gas Emissions Assessment from Eight Landfills/Landfill Areas at the Navy Installation Restoration Site1 Alameda Point, California

REVISED DRAFT

Prepared For:

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February, 2000

CES#1299/ /AlamedaPoint/TM/wpd

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EXECUTIVE SUMMARY

Field measurements were conducted at eight municipal or mixed waste landfills located at the Navy Installation Restoration (IR) Site 1 located at Alameda Point, California on December 8, 1999. The Navy was interested in measuring the flux of landfill gases at the land surface including methane and volatile organic compounds (VOCs) associated with the decomposition of biodegradable solid waste and or emissions from mixed waste. Testing was conducted in order to provide data representative of air emissions suitable for site evaluation of landfill gas emission potential. These actual emission measurement data will be compared to emission estimates generated by landfill gas predictive emission modeling. These data may also be used for exposure assessment and health risk assessment. Samples were collected from the land surface at locations identified by historic site data as locations with maximum emissions potential in order to provide a conservative estimate of landfill emissions. These measurement locations were also co-located at locations where soil gas was sampled and analyzed.

A limited field program was conducted and flux measurements were made using the United States Environmental Protection Agency (US EPA) recommended surface flux chamber. The surface flux chamber testing was conducted at one or more test locations at each of the 8 landfills/landfill areas. Only one test was performed at one landfill cell (North central) because the majority of the landfill was covered by pavement associated with the former air strip. Testing was conducted at 2 locations at the other landfill and one location on one landfill was tested twice during one day to collect data on diurnal variability. Flux measurements were performed following the US EPA flux chamber protocol and all surface flux gas samples were collected in canisters and analyzed off-site using ASTM Method D-1945 for methane and US EPA Method TO-14 for a target list of over 60 VOCs.

In general, the surface flux levels were low for landfill gas samples (i.e., less than 1 ug/m2,min-1). The flux of landfill gas at the land surface did not detect methane (780 ug/m2,min-1 method detection limit), however VOCs were routinely detected at levels generally less than 0.1 ug/m2,min-1.

The flux data measured at the land surface can be used for a variety of purposes including estimating the emission rate of the landfills tested by multiplying the measured flux by the surface area of the landfill. Emission rate data can be used to assess potential impact to air quality, in a health risk assessment, or used in an engineering evaluation for solid waste management purposes.

The flux data can be used to estimate exposure to subsurface contamination by emissions to ambient air. Outdoor flux can be multiplied by the surface area of the plume footprint to obtain locale specific emissions to ambient air.

I. INTRODUCTION

This technical memorandum describes the field testing that was conducted in order to assess the surface air emissions of methane and VOCs from subsurface sources at Alameda Point, IR Site #1. Area source flux data were collected with the intention of using the flux data as input to a site-specific air pathway assessment and evaluation of landfill gas emission potential. Testing was conducted by Dr. C.E. Schmidt on December 8, 1999 with representatives of TetraTech EM Inc. (TtEMI).

The objective of this study was to provide data representative of air emissions of landfill gas including methane and VOCs from the 7 landfill cells and the former burn area. Sampling locations are described in Table 1. Surface flux chamber data are reported as flux values (micrograms per square meter per minute, $ug/m^2,min^{-1}$) for each study compound detected and reported. The surface flux data can be used to assess emissions of landfill gas at the landfill area surface for a variety of purposes, including: bench-marking predicted surface emissions by comparing measured emissions per landfill area to model-predicted emission estimates; exposure via the inhalation pathway in a health risk assessment from current land use scenarios; assessment of landfill gas production capability; evaluation of waste site remedial technologies (i.e., excavation, gas collection, stabilization, capping, etc.); and evaluation of land re-use alternatives.

This memorandum includes a discussion of the surface emission flux testing methodology, quality control procedures, results, discussion of the results, and summary statements. Soil gas testing activities and predictive landfill gas emission modeling results are reported elsewhere.

II. TEST METHODOLOGY

Testing for surface flux was conducted using the US EPA recommended Surface Isolation Flux Chamber (US EPA, 1986). Flux chamber sampling locations were selected to represent typical or maximum emission potential and were also selected to spatially represent each of the 8 landfills areas. Surface flux locations were co-located with landfill gas probes so that a correlation could be established between subsurface soil gas levels and surface flux levels. Flux testing locations are shown in Figure 1.

The operation of the surface flux chamber is given below:

1) Flux chamber, sweep air, sample collection equipment, and field documents were located on-site.

2) The site information, location information, equipment information, date, and proposed time of testing were documented on the Emissions Measurement Field Data Sheet.

3) The exact test location was selected and placed about 1/4" into the land surface sealing the chamber. Thermocouples were placed in order to monitor surface/air temperatures outside of the chamber.

4) The sweep air flow rate was initiated and the rotometer, which stabilizes the flow rate, was set at 5.0 liters per minute. A constant sweep air flow rate was maintained throughout the measurement for each sampling location.

5) Flux chamber data were recorded every residence interval (6 minutes) for five intervals, or 30 minutes. The sample line was purged with a hand pump.

6) At steady-state (assumed to be established at time greater than 5 residence intervals), the canister sample was collected by interfacing the canister to the sample line of the chamber, pulling a vacuum on line with the canister, and collecting a 6 liter canister sample.

7) After sample collection, all field data were documented on the data sheet.

8) After sampling, the flux measurement was discontinued by shutting off the sweep air, removing the chamber, and securing the equipment.

9) Sampling locations were recorded on the field data sheet. The equipment was then relocated to the next test location and steps 1) through 8) were repeated.

Flux chamber samples were collected in evacuated stainless steel canisters. Canister samples were analyzed by Air Toxics Limited, Inc. located in Folsom, California using ASTM Method D-1945 for methane and US EPA Method TO-14 for VOCs.

III. QUALITY CONTROL

Control procedures that were used to assure that data of sufficient quality resulted from the flux chamber study are listed and described below. The application and frequency of these procedures were developed to meet the program data quality objectives as described in the project work plan (Schmidt, C.E., November, 1999).

Field Documentation -- A field notebook containing data forms, including sample chain-of-custody (COC) forms, was maintained for the testing program. Attachment A contains the Emission Measurement Data Sheets.

Chain-of-Custody -- COC forms are provided in Attachment B.

Method Spike Analysis – Data were not provided.

Laboratory Replicate Analysis — Two samples were analyzed in replicate for methane and VOCs and the precision for the methods was reported as relative percent difference (RPD) per compound. The RPD for methane was not determined since both samples showed non-detect for methane. These data show good comparability but do not provide precision information. The RPD for the VOC sample/duplicate 122-S01-049/-049-D was between 0 and 6.7 for 5 replicate compounds (average RPD of 5.5 and between 9.8 and 46 (average RPD 23 with one pair exceeding criteria) for sample/duplicate 122-S01-151/-151-D. These data indicate acceptable method performance for all methods (QC criteria of 90% of pairs $\pm$30 RPD).

Laboratory Blank Samples – Four method blank samples were analyzed for methane. Methane was not detected in any of the method blank samples above MDL. Three laboratory method blank samples were analyzed for VOCs. The blank tests did not detect VOCs above MDLs for all blank samples. These data indicate acceptable performance.

Field System Blank — Two field blanks were collected for the flux chamber system by placing the flux chamber on a sheet of teflon and operating the chamber as per field testing protocol. A blank sample was collected prior to the testing (pre-use) and one was collected at the end of the testing. (post-use). Five compounds were detected in the initial blank including: chloromethane (0.1 ppbv), toluene (0.49 ppbv), acetone (2.6 ppbv), 1,4-dioxane (0.72 ppbv), and ethanol (1.0 ppbv). One compound acetone (1.1 ppbv) was detected in the post-use blank sample. Compounds found near the MDL or at these levels for a "source assessment" on landfills is not considered significant. Compounds in the system blank can come from the clean chamber, the teflon tubing, the sweep air, the sample canister, and the analytical system. These compounds in particular polar or oxygenated compounds as well as others are commonly seen in system blank samples. Data above these levels are highlighted and used as representative of site specific flux. These data indicate acceptable method performance.

Background Sample — One background sample was collected near the test area on site. The background sample provides data on the affect the surrounding urban air has on all flux

measurements. The urban air including the contaminants found in urban air, exchange with the soil gas. During the flux tests, these compounds can exchange with the flux chamber gas and are measured as field compounds. Nine compounds were detected in the background sample, including: freon 12 (0.49 ppbv), chloromethane (0.32 ppbv), freon 11 (0.20 ppbv), methylene chloride (0.14 ppbv), benzene (0.25 ppbv), toluene (0.67 ppbv), m,p-xylene (0.19), acetone (1.2 ppbv), and ethanol (7.4 ppbv). Compounds found above these levels are highlighted and used as representative of site specific flux and not associated with urban air contaminants.

Field Replicate Sample — Two field replicate samples were collected by sampling a second canister sample after a site sample collection. The results of the replicate samples are given below:

Sample	*Compound Pairs*	*RPD Range*	*RPD Ave*	*Out*	*No Shows*
122-S01-055/-103	11	6.2-to-190	36	1	1
122-S01-059/-104	2	43-to-47	45	0	11

Ideally, the replicate sample should report all of the sample compounds and no others. Additionally, sample/replicate pairs should have a RPD of less than the criteria or ± 50. The lack of replicability and non-repeatability is common for compounds near the method detection limit; in this case, within and below about 10 ppbv. Compounds reported in the region of higher certainty (5-to-15 times MDL) typically showed better precision as compared to lower levels of detection. These data indicate acceptable method performance.

Laboratory Quality Control Data -- Laboratory quality control data for analytical methods are included in Attachment C.

Control Point Data — Control point data were collected at one location B-11 on the same day but at different times of the day (0826 and 1436). These samples are similar in compound type and level, however, at these low levels, differences between analysis are found. Of the 6 compounds detected in both control samples, 2 compound levels increase, 2 compound levels decrease, and one stays the same. In addition, 7 compounds are not repeated. The purpose of the control test was to determine if the flux levels change significantly over the day. These data show no consistent pattern of change over the day, although the sample data show differences. These differences are similar to differences found in replicate sample collection and analysis.

IV. RESULTS AND DISCUSSIONS

All field data for the surface flux chamber testing are presented in Table 2 in flux units ($\mu g/m^2$,min-1). The complete laboratory report is included in Attachment C.

Surface flux data are calculated using measured target compound concentrations and flux chamber operating parameter data (sweep air flow rate of 5.0 liters per minute [L/min], surface area of 0.13 square meters [m^2]). The site emissions can be calculated by multiplying the flux by the surface area of the source. The flux is calculated from the sweep air flow rate Q (cubic meters per minute [m^3/min]), the species concentration Yi (micrograms per cubic meter [$\mu g/m^3$)], and exposure to the chamber surface area A (square meters [m^2]), as follows:

$$Fi = \frac{Q \cdot Yi}{A}$$

In general, the field data were non-detect or low relative to flux as measured on typical municipal landfills.

The surface flux data from these landfills/landfill areas can be used to assess emissions of landfill gas at the land surface from the landfill for a variety of purposes, including: exposure via the inhalation pathway in a health risk assessment from current land use scenarios; assessment of landfill gas production capability; evaluation of waste site remedial technologies (i.e., excavation, gas collection, stabilization, capping, etc.); and evaluation of land re-use alternatives. Outdoor flux can be multiplied by the surface area of the plume footprint to obtain locale specific emissions to ambient air. Indoor infiltration can be calculated by multiplying flux data near the foundation by the footprint of the plume under the building and multiplying the emissions by an infiltration factor typical of slab construction (i.e., 0.5%-to-2%, Schmidt, et al, June, 1998). Infiltration emission data can also be estimated using predictive modeling providing a second approach for collecting potential indoor emission rate data. Emission rate data can also be used in engineering evaluations as related to remedial technologies and land re-use options.

V. SUMMARY

Surface flux measurements were made at one or more locations at each of 8 landfill areas at the IR Site 1 for the purpose of obtaining data of sufficient quality to assess the air emissions of compounds found at the land surface as related to subsurface solid waste. The following is a summary of activities and results associated with this objective:

- Surface flux measurements of study compounds were measured at one or more locations at 8 landfill areas using the US EPA recommended surface flux chamber technology.
- Field and laboratory quality control data indicate acceptable sampling method performance.
- In general, the field data were non-detect or low relative to surface flux measured at other municipal landfill sites. The field data are summarized below by landfill.
- The compound detected at the highest flux level was acetone (3.9 ug/m2,min-1; sample 122-S01-079, B21).
- The compound detected most frequently above system blank and background levels was acetone with 11 of 16 occurrences.
- Methane was not detected above MDL in any surface flux samples (13 ppmv, 20 mg/m3, 780 ug/m2,min-1).
- Vinyl chloride was not detected above MDL in any surface flux samples (0.13 ppbv, 0.32 ug/m3, 0.012 ug/m2,min-1)

REFERENCES

US EPA. 1986. "Measurement of Gaseous Emission Rates From Land Surfaces Using an Emission Isolation Flux Chamber, Users Guide." EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada, EPA Contract No. 68-02-3889, Work Assignment No. 18, February 1986.

Schmidt, C.E. *Workplan: Source Test Protocol for Landfill Gas Emission Assessment from Eight Landfills/Landfill Areas at the Navy Installation Restoration Site #1, Alameda Point, California,* Prepared for the TetraTech EM Inc, November, 1999.

Table 2. Summary of Surface Flux Data (ug/m2,min-1).

	BLANK 1	BLANK 2	BKGD	NE Corner	NE Corner	NE Central	Central E	Central E	Central S
	N/A	N/A	N/A	B4	B1	B29	B5	B31	B12
COMPOUND	S01-115	S01-116	S01-117	S01-045	S01-039	S01-095	S01-047	S01-099A	S01-061
Methane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 12	ND	ND	0.096	ND	0.048	**0.13**	0.078	0.073	0.050
Freon 114	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.025	ND	0.028	ND	**0.030**	**0.054**	0.028	**0.039**	**0.063**
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 11	ND	ND	0.044	ND	ND	**0.085**	0.029	0.035	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	0.019	ND	ND	0.027	0.020	ND	0.018
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
c,1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	**0.066**
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	0.031	ND	**0.040**	**0.058**	**0.043**	0.018	**0.11**
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND
c,1,2-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.072	ND	0.098	0.026	**0.16**	**0.17**	0.070	**0.10**	0.025
t,1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene Dibromide	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	**0.041**	ND
Ethyl Benzene	ND	ND	ND	ND	ND	**0.044**	ND	**0.029**	ND
m,p-Xylene	ND	ND	0.032	ND	**0.047**	**0.047**	ND	0.032	ND
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2 ummary of Surface Flux Data (ug/m2,min-1).

	BLANK 1	BLANK 2	BKGD	NE Corner	NE Corner	NE Central	Central E	Central E	Central S
	N/A	N/A	N/A	B4	B1	B29	B5	B31	B12
COMPOUND	S01-115	S01-116	S01-117	S01-045	S01-039	S01-095	S01-047	S01-099	S01-061
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Butadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.24	0.10	0.11	**0.52**	**0.27**	**0.63**	**0.96**	**0.48**	**0.88**
Carbon Disulfide	ND	ND	ND	ND	ND	ND	0.12	ND	ND
2-Propanol	ND	ND	ND	ND	ND	ND	ND	ND	ND
t,1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	0.10	ND	0.14	**0.20**	**0.10**	**0.083**
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	0.10	ND	ND	ND	**0.15**	**0.27**	**0.12**	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromform	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.074	ND	0.55	0.093	0.11	0.17	0.15	ND	0.055
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note- Values in BOLD are above system blank and/or background levels.

Table 2. Summary of Surface Flux Data (ug/m2,min-1).

	Central S	Central S	South	South	W-Central	W-Central	W-Central	W-Central	W-Central	W-Central
	B9	B9-D	B17	B20	B6	B6- Dupl	B11	B11-D	B11-C	B11-C-Dupl
COMPOUND	S01-055	S01-103	S01-071	S01-077	S01-049	S01-049	S01-059	S01-104	S01-151	S01-151
Methane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 12	0.090	0.074	ND	ND	ND	ND	ND	ND	ND	ND
Freon 114	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	0.027	0.019	ND	ND	0.012	ND	**0.10**	ND	**0.038**	0.043
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 11	0.033	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	0.029	0.021	ND	ND	ND	ND	0.022	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
c,1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	**0.067**	ND	**0.092**	**0.11**
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	**0.045**	ND	ND	ND
Benzene	**0.091**	**0.082**	ND	ND	0.016	0.017	**0.11**	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	**0.096**	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
c,1,2-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**0.26**	**0.22**	ND	ND	**0.021**	0.022	ND	0.032	0.055	0.069
t,1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene Dibromide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	**0.029**	**0.026**	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	**0.10**	**0.094**	ND	ND	ND	ND	ND	**0.041**	**0.083**	**0.12**
o-Xylene	**0.037**	**0.033**	ND	ND	ND	ND	ND	ND	ND	**0.070**
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	**0.12**	**0.078**
1,2,4-Trimethylbenzene	**0.035**	**0.029**	ND	ND	ND	ND	ND	**0.029**	**0.28**	**0.37**

Table Summary of Surface Flux Data (ug/m2,min-1).

	Central S	Central S	South	South	W-Central	W-Central	W-Central	W-Central	W-Central	W-Central
	B9	B9-D	B17	B20	B6	B6- Dupl	B11	B11-D	B11-C	B11-C-Dupl
COMPOUND	S01-055	S01-103	S01-071	S01-077	S01-049	S01-049	S01-059	S01-104	S01-151	S01-151
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Butadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.12	0.18	0.18	**0.28**	0.17	0.18	**0.36**	**0.56**	0.17	0.22
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t,1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND
Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	**0.13**	ND	ND	**0.20**	ND	**0.21**	**0.27**
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	0.17	**1.8**	0.093	0.14	0.071	0.074	0.068	0.11	0.068	0.13
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.056**
Heptane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2. Summary of Surface Flux Data (ug/m2,min-1).

	N-Central	N-Central	NW	NW
	B21	B24	B26	B28
COMPOUND	S01-079	S01-085	S01-089	S01-093
Methane	ND	ND	ND	ND
Freon 12	ND	ND	ND	0.071
Freon 114	ND	ND	ND	ND
Chloromethane	**0.41**	0.020	0.022	**0.031**
Vinyl Chloride	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Chloroethane	**0.067**	ND	ND	ND
Freon 11	ND	0.041	ND	0.037
1,1-Dichloroethene	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
c,1,2-Dichloroethene	**0.35**	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Benzene	**0.080**	0.026	0.018	**0.043**
1,2-Dichloroethane	ND	ND	ND	ND
Trichloroethene	**0.59**	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
c,1,2-Dichloropropene	ND	ND	ND	ND
Toluene	**0.10**	0.076	0.056	**0.11**
t,1,2-Dichloropropane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND
Ethylene Dibromide	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Ethyl Benzene	ND	ND	ND	ND
m,p-Xylene	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND
Styrene	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND

Table 2 Summary of Surface Flux Data (ug/m2,min-1).

	N-Central	N-Central	NW	NW
	B21	B24	B26	B28
COMPOUND	S01-079	S01-085	S01-089	S01-093
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
Chlorotoluene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND
Propylene	ND	ND	ND	ND
1,3-Butadiene	ND	ND	ND	ND
Acetone	**3.9**	**0.89**	0.22	**0.70**
Carbon Disulfide	ND	ND	ND	ND
2-Propanol	**1.4**	ND	ND	ND
t,1,2-Dichloroethene	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND
2-Butanone	**0.33**	0.20	ND	ND
Hexane	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	**0.20**
Bromodichloromethane	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
Bromform	ND	ND	ND	ND
4-Ethyltoluene	ND	ND	ND	ND
Ethanol	0.89	0.068	ND	ND
Methyl tert-butyl ether	**0.12**	**0.14**	ND	ND
Heptane	ND	ND	ND	ND

Table 3. Comparison of On-Site Lab Analysis to Analysis of Split Soil Gas Samples by EPA Method TO-14 for VOCs (mg/m3) and ASTM 1945 for Methane (%).

	On-Site Lab	Off-Site Lab	On-Site Lab	Off-Site Lab	On-Site Lab	Off-Site Lab
	B9	B9 Split	B10	B10	B15	B15
COMPOUND	S01-056	S01-056-D	S01-058	S01-058-D	S01-068	S01-068-D
Methane (%)	29	50	4.1	4.2	<0.001	51
Freon 12	<1	ND	<1	ND	<1	ND
Freon 114	NA	ND	NA	ND	NA	ND
Chloromethane	NA	ND	NA	ND	NA	0.0028
Vinyl Chloride	<1	1.5	<1	ND	<1	ND
Bromomethane	NA	ND	NA	ND	NA	ND
Chloroethane	<1	ND	<1	ND	<1	ND
Freon 11	<1	ND	<1	ND	<1	ND
1,1-Dichloroethene	<1	ND	<1	ND	<1	ND
Freon 113	<1	ND	<1	ND	<1	ND
Methylene Chloride	<1	ND	<1	8.7	<1	ND
1,1-Dichloroethane	<1	ND	<1	ND	<1	ND
c,1,2-Dichloroethene	<1	0.068	<1	ND	<1	ND
Chloroform	<1	ND	<1	ND	<1	ND
1,1,1-Trichloroethane	<1	ND	<1	ND	<1	ND
Carbon Tetrachloride	<1	ND	<1	ND	<1	ND
Benzene	<1	0.14	<1	4.3	<1	0.017
1,2-Dichloroethane	<1	ND	<1	ND	<1	ND
Trichloroethene	<1	ND	<1	ND	<1	ND
1,2-Dichloropropane	NA	ND	NA	ND	NA	ND
c,1,2-Dichloropropene	NA	ND	NA	ND	NA	ND
Toluene	<1	0.19	1.7	4.6	<1	0.067
t,1,2-Dichloropropane	NA	ND	NA	ND	NA	ND
1,1,2-Trichloroethane	<1	ND	<1	ND	<1	ND
Tetrachloroethene	<1	ND	<1	ND	<1	ND
Ethylene Dibromide	NA	ND	NA	ND	NA	ND
Chlorobenzene	<1	ND	<1	ND	<1	ND
Ethyl Benzene	<1	0.049	8.0	3.9	<1	0.040
m,p-Xylene	<1	0.12	14	6.3	<1	0.091
o-Xylene	<1	0.05	11	2.9	<1	0.039
Styrene	NA	ND	NA	ND	NA	ND
1,1,2,2-Tetrachloroethane	<1	ND	<1	ND	<1	ND
1,3,5-Trimethylbenzene	NA	ND	NA	ND	NA	0.032
1,2,4-Trimethylbenzene	NA	0.057	NA	4.7	NA	0.11

Table 2 Comparison of On-Site Lab Analysis to Analysis of Split Soil Gas Samples by EPA Method TO-14 for VOCs (mg/m3) and ASTM 1945 for Methane (%).

	On-Site Lab	Off-Site Lab	On-Site Lab	Off-Site Lab	On-Site Lab	Off-Site Lab
	B9	B9 Spit	B9	B9 Spit	B9	B9 Spit
COMPOUND	S01-056	S01-056-D	S01-056	S01-056-D	S01-056	S01-056-D
1,3-Dichlorobenzene	NA	ND	NA	ND	NA	ND
1,4-Dichlorobenzene	NA	ND	NA	ND	NA	ND
Chlorotoluene	NA	ND	NA	ND	NA	ND
1,2-Dichlorobenzene	NA	ND	NA	ND	NA	ND
1,2,4-Trichlorobenzene	NA	ND	NA	ND	NA	ND
Hexachlorobutadiene	NA	ND	NA	ND	NA	ND
Propylene	NA	ND	NA	ND	NA	ND
1,3-Butadiene	NA	ND	NA	ND	NA	ND
Acetone	**<5**	**0.058**	**<5**	**ND**	**<5**	**0.24**
Carbon Disulfide	NA	ND	NA	ND	NA	ND
2-Propanol	NA	ND	NA	28	NA	ND
t,1,2-Dichloroethene	**<1**	**ND**	**<1**	**ND**	**<1**	**ND**
Vinyl Acetate	NA	ND	NA	ND	NA	ND
2-Butanone	**<5**	**ND**	**<5**	**ND**	**<5**	**ND**
Hexane	NA	0.25	NA	32	NA	0.070
Tetrahydrofuran	NA	ND	NA	ND	NA	ND
Cyclohexane	NA	0.74	NA	ND	NA	ND
1,4-Dioxane	NA	ND	NA	ND	NA	ND
Bromodichloromethane	NA	ND	NA	ND	NA	ND
4-Methyl-2-Pentanone	**<5**	**ND**	**<5**	**ND**	**<5**	**ND**
2-Hexanone	**<5**	**ND**	**<5**	**ND**	**<5**	**ND**
Dibromochloromethane	NA	ND	NA	ND	NA	ND
Bromform	NA	ND	NA	ND	NA	ND
4-Ethyltoluene	NA	ND	NA	ND	NA	0.043
Ethanol	NA	ND	NA	ND	NA	ND
Methyl tert-butyl ether	NA	ND	NA	ND	NA	ND
Heptane	NA	ND	NA	210	NA	0.87
1,1,1,2-Trichloroethene	<1	NA	<1	NA	<1	NA

Freon-11 is Trichlorofluoromethane; Freon-12 is Dichlorodifluoromethane; Freon-113 is 1,1,2-Trichlorotrifluoroethane
MEK is 2-Butanone; MIBK is 4-Methyl, 2-Pentanone
Dichloromethane is Methylene Chloride
Compounds in BOLD are detected by both techniques, except for 1,1,1,2-Trichloroethene

ATTACHMENT A

EMISSION MEASUREMENT DATA SHEETS

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/7/99 SAMPLERS CES

LOCATION ALAMEDA THEMI

SURFACE DESCRIPTION BLANK #1; TEFLON

CURRENT ACTIVITY NA

INSTRUMENT TYPE NA I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE NA

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL 'Y' INDOOR CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☐ Wind at 5', NA mph Wind at Seal, ____ mph

TEMP NA RAIN: Yes ☐ No ☒ NA Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☒ Wet Wipe ☐ Dry Wipe ☐ None ☐ _____

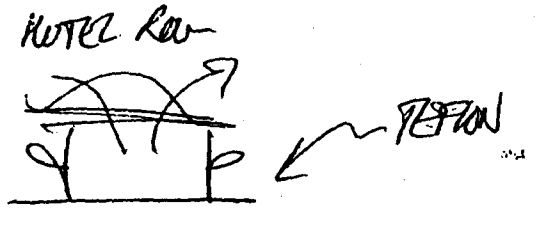
SAMPLE LINE: BACK FLUSHED PRIOR TO START ☐ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP 20,000 ppmv CC 12735 SUPPLIER SM PSIG START 700 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)				Real-Time (ppmv)		Sample Number	Comments
			Chamber		Ambient		NA			
			Surf	Air	Surf	Air				
1927	5.0	0								-29"
1933	↓	1								
1939	↓	2								
1945		3		NA						
1951		4								FLUX FIELD BLK ✓
1957		5							#12958	122-501-115

COMMENTS:

SITE DIAGRAM



CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/3/99 SAMPLERS CES

LOCATION ALAMEDA POINT; SOI-B1Z

SURFACE DESCRIPTION GRASS ; METHANE 0.020% SOILGAS

CURRENT ACTIVITY NA

INSTRUMENT TYPE NA I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE NA

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ PRE-DAWN Cloudy ☐ Wind at 5', 3-5 mph Wind at Seal, ____ mph

TEMP 43° RAIN: Yes ☐ No ☒ Comment _____

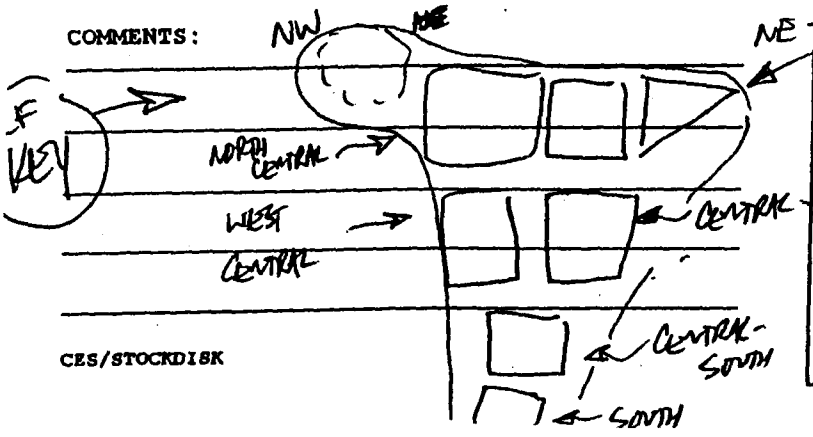
PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☐ None ☒ BLANK/FLUX TRACK

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 12735 SUPPLIER SCOTT M PSIG START 500 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
0625	5.0	0								-29"
0631		1								
0637		2								
0643		3								
0649		4								
0655		5	111°	42°	41°	43°			#12666	1ZZ-SOI-061
									SG-	SOI-B1Z-0

COMMENTS:



SITE DIAGRAM

Ø-LOCATION

(N) SG-SOI-B1Z-3

CENTRAL-SOUTH LT

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION ALAMEDA POINT | SOL-B9 ; 24"/24"

SURFACE DESCRIPTION GRAVEL / SOIL

CURRENT ACTIVITY NA

INSTRUMENT TYPE NA I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE NA

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL V CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ SUNRISE Wind at 5', 1-3 mph Wind at Seal, ____ mph

TEMP 42° RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 12735 SUPPLIER SM PSIG START 400 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
0708	5.0	0								-24" / -24"
0714	↓	1								
0720		2								
0726	↓	3								
0732		4								
0738		5	41°	41°	41°	42°			11034	122-SOL-055
										SG-SOL-B9-0
0744									11306	122-SOL-103
										DUPLICATE -D

COMMENTS:

SITE DIAGRAM SG-SOL-BA-0-S

MAP - SG-9

CENTRAL SOUTH LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION ALAMEDA POINT; LOCATION SG-SOI-B11; METHANE 4.5%, VC 37 mg/m3

SURFACE DESCRIPTION GRASS

CURRENT ACTIVITY NA

INSTRUMENT TYPE NA I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE NA

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL V CONDENSATION: Yes ☒ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-1 mph Wind at Seal, ____ mph

TEMP 47° RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☒ Used ☐

SWEEP AIR VHP CC 12735 SUPPLIER SM PSIG START 100+ PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
0801	5.0	0								-29" / -29"
0807	↓	1								
0813		2								
0819		3								
0825		4								
0826		5	48°	47°	48°	47°			12083	122-SOI-059
										SG-SOI-B11-0
0832									25267	122-SOI-104
										SG-SOI-B11-0

COMMENTS:

* HIGH VINYL CHLORIDE 37 ug/L UG GROUNDWATER VC!

SITE DIAGRAM

SEE MAP SG-B11

WEST CENTRAL LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/9/99 SAMPLERS CES

LOCATION ALAMEDA POINT ; LOCATION SG-SOI-B5 ; METHANE < 0.001 %

SURFACE DESCRIPTION GRASS

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP MA RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☒ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 2000 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
0858	5.0	0								-29"
0904	↓	1								
0910		2			NA					
0916		3								
0922		4								
0928		5							22496	122-SOI-047
										SG-SOI-B5-0

COMMENTS:

SITE DIAGRAM

SEE MAP - B5
CENTRAL-EAST LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION ALAMEDA POINT ; LOCATION SOI-B6 ; METHANE 2.8% ; VC 5.6 mg/m³

SURFACE DESCRIPTION GRASS

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☒ Cloudy ☐ Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP 52° RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START _____ PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
0944	5.0	0								-29'
0950	↓	1								
0956	↓	2								
1002	↓	3								
1008		4								
1014		5	60°	58°	58°	52°			25264	122-501-049
										SG-501-B6-0

COMMENTS:

SITE DIAGRAM

SEE MAP B6

WEST CENTRAL LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CBS

LOCATION ALAMEDA POINT; LOCATION SOI-B4

SURFACE DESCRIPTION SAND

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☒ Cloudy ☐ Wind at 5', 3-5 mph Wind at Seal, ____ mph

TEMP 58 RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 1900 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1040	5.0	0								-29'
1046	↓	1								
1052		2								
1058		3								
1104	↓	4								
1108		5	55°	65°	64°	56°			25301	122-SOI-045
1120										SG-SOI-B4

COMMENTS:

SITE DIAGRAM

SEEMAP SOI-B4

NE CORNER LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION T-EMI ; ALAMEDA POINT ; SOI-B1 ; METHANE < 0.001%

SURFACE DESCRIPTION GLASS

CURRENT ACTIVITY —

INSTRUMENT TYPE — I.D. NO. — TYPE — ID NO. —

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS —

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ —

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☐ BARM PRESS —

AMBIENT CONDITIONS: Sun ☐ P.Sun ☒ Cloudy ☐ Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP 38 RAIN: Yes ☐ No ☒ Comment —

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☐ None ☐ —

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☐ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC BBBBB SUPPLIER AL SM PSIG START 1750 PSIG STOP —

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1136	5.0	0								29"
1142	↓	1								
1148	↓	2								
1154 1152		3								
1200		4								
1206		5	62°	64°	59°	56°			05412	122-SOI-039
										SG-SOI-B1-0

COMMENTS:

SITE DIAGRAM

SOI-B1

NE CORNER LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION TREMD, ALAMEDA POINT; SD1-B17; 2.4% METHANE

SURFACE DESCRIPTION GRASS

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE _____

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☒ Cloudy ☐ Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP NA RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☒ Used ☐

SWEEP AIR VMP CC 8888 SUPPLIER SN PSIG START — PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1230	5.0	0								-29"
1236		1								
1242		2								
1248	V	3		NA						
1254		4								
1300		5							13859	122-SO1-071
										SG-SO1-B17-0

COMMENTS:

SITE DIAGRAM

SEE MAP

SOUTH LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION TEMI; ALAMEDA POINT; S6-SD-BZO SOUTH LF; 20.0019 CH_4

SURFACE DESCRIPTION DRY GRASS

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS —

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☒ Cloudy ☐ Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP _____ RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 1500 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)				Real-Time (ppmv)		Sample Number	Comments
			Chamber		Ambient					
			Surf	Air	Surf	Air	NK			
1320	5.0	0								-29
1326	↓	1								
1332		2								
1338	↓	3		NA						
1344		4								
1350		5							11299	122-SD1-077
										S6-SD1-BZO-0

COMMENTS:

SITE DIAGRAM

SEE MAP

SOUTH LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/9/99 SAMPLERS CES

LOCATION TEMI; KAMEDA POINT; SG-SG-B11; HIGH VC 34 mg/m3

SURFACE DESCRIPTION CONTROL POINT; SAME SPOT

CURRENT ACTIVITY

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ PRIOR

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☒ Cloudy ☐ Wind at 5', 2-3 mph Wind at Seal, ____ mph

TEMP MA RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 1400 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1406	5.0	0								-29"
1412	↓	1								
1418		2								
1424	↓	3		NA						
1430		4							(1)	122-SO1-15
1436		5							R-2	122-SO1-05
										SG-SO1-B11-C

COMMENTS:

SITE DIAGRAM

SEE MAP

WEST-CENTRAL LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CBS

LOCATION TEMI; ALAMEDA POINT; SG-501-B21; 3.190 CH4

SURFACE DESCRIPTION DRY SAND

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☒ No ☐ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☒ Wind at 5', 1-2 mph Wind at Seal, ____ mph

TEMP 50° RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP cc 88888 SUPPLIER SM PSIG START 1300 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)				Real-Time (ppmv)		Sample Number	Comments
			Chamber		Ambient					
			Surf	Air	Surf	Air	NA			
1450	5.0	0								-29"
1456	↓	1								
1502		2								
1508	↓	3								
1514		4								
1520		5	57°	57°	59°	59°			20932	122-501-079
										SG-501-B21-0

COMMENTS:

SITE DIAGRAM

SEE MAP
NORTH CENTRAL LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/6/99 SAMPLERS CES

LOCATION POINT ALAMEDA POINT, LOCATION SG-SOI-B24 ; 0.006% CH4

SURFACE DESCRIPTION GRASS

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE —

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☒ Wind at 5', 2-3 mph Wind at Seal, ____ mph

TEMP NA RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 1200 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1528	5.0	0								-29"
1534	↓	1								
1540		2		NA						
1546	↓	3								
1552		4								
1558		5							30847	122-SOI-085
									3	SG-SOI-B24-0

COMMENTS:

SITE DIAGRAM

SEE MAP

NORTH CENTRAL LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION T+EMI ; ALAMEDA POINT ; SG-501-B26 ; 3.2% METHANE

SURFACE DESCRIPTION DRY SAND

CURRENT ACTIVITY

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☒ Wind at 5', 1-3 mph Wind at Seal, ____ mph

TEMP 53° RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☐ New ☒ Used ☐

SWEEP AIR UHP CC 888888 SUPPLIER SM PSIG START 1100 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1604	5.0	0								-29
1610	↓	1								
1616		2								
1622		3								
1628		4								
1634		5	53°	53°	53°	53°			23991	122-501-089
										SG-501-B26-0

COMMENTS:

SITE DIAGRAM

SEE MAP

NW LANDFILL

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

28

12/8/99 SAMPLERS CES

LOCATION T+EMT; ALAMEDA POINT; LOCATION # SG-501-B26

SURFACE DESCRIPTION SAND

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☒ Wind at 5', GUSK 1-2 mph Wind at Seal, ____ mph

TEMP MA RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

SWEEP AIR UHP CC 88888 SUPPLIER SM PSIG START 1000 PSIG STOP ____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1642	5.0	0								~29
1648	↓	1								
1654		2								
1700		3		NA						
1706		4								
1712	↓	5							12945	122-501-093
										SG-501-B28-0

COMMENTS:

SITE DIAGRAM

SEE MAP

NW LF

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION TTEMI; KAWEAH POINT; SS-SOI

SURFACE DESCRIPTION GRAVEL

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE _____

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. 4 PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☒ DARK Wind at 5', 2-3 mph Wind at Seal, ____ mph

TEMP NA RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

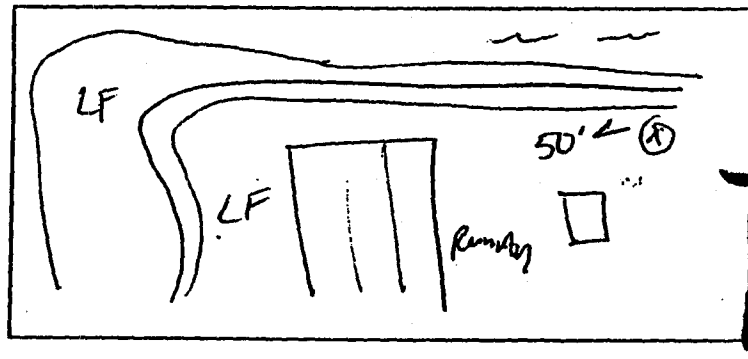
SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

SWEEP AIR UHP CC 66668 SUPPLIER SM PSIG START 900 PSIG STOP —

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv)		Sample Number	Comments
1718	50	0					NA			-29"
1724	↓	1								
1730	↓	2								
1736		3								
1742		4								FWX 3ACK6D
1748		5							23610	122-SOI-117

COMMENTS: ABOUT 2000 YDS FROM LF ALONG ACCESS ROAD ~50' SOUTH 70' SOUTH OF WELL "HCN 1" IN ROAD

SITE DIAGRAM



CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION TANKS; ALAMEDA POINT; SG-SOI-B29; ASPHALT

SURFACE DESCRIPTION OPEN SOIL ~10" DIAM HOLE IN ASPHALT ABOUT 15' FROM SB29

CURRENT ACTIVITY

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☐ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☐ DARK Wind at 5', 0-1 mph Wind at Seal, ____ mph

TEMP _____ RAIN: Yes ☐ No ☐ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☐ PURGED PRIOR TO SAMPLING ☐ New ☐ Used ☐

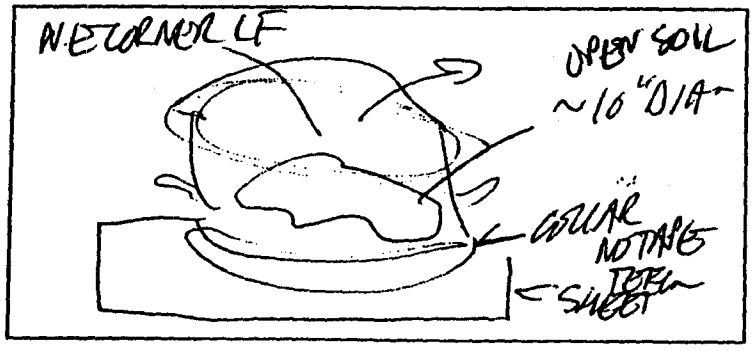
SWEEP AIR VHP CC [illegible] SUPPLIER SM PSIG START 800 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv)		Sample Number	Comments
1800	5.0	0					N/A			29'
1806	↓	1								
1812		2								
1818		3								
1824		4								
1830		5							14885	122-SOI-095
										SG-SOI-B29-0

COMMENTS: HOLE IN ASPHALT APPROX 10" DIAM

ASPHALT NOT CRACKED BUT HAS "POT HOLES" OR BREAK THROUGH PLANTS OR WEEDS; LOW % <1%

SITE DIAGRAM



CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION TTEMI; LOCATION SG-SOI-B31; 0.002 % CH4

SURFACE DESCRIPTION ALAMEDA POINT

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE _____

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒
AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y; COLLAR/SHEET CONDENSATION: Yes ☐ No ☐ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☐ DARK Wind at 5', 1-2 mph Wind at Seal, ____ mph

TEMP _____ RAIN: Yes ☐ No ☒ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☐ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

SWEEP AIR UHP CC 99999 SUPPLIER SM PSIG START 700 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv)		Sample Number	Comments
1832	5.0	0					NA			~29'
1838	↓	1			NA					
1844		2								
1850		3								
1856		4								
1902		5							9920	122-SOI-099
										SG-SOI-B31-0

COMMENTS:

MOSTLY OPEN SOIL

SITE DIAGRAM

SEE MAP

CENTER-EAST LF

CES/STOCKDISK

SURFACE FLUX MEASUREMENT DATA FORM

DATE 12/8/99 SAMPLERS CES

LOCATION ~~BLANK~~ FT, TEDLAR, 2ND BLANK

SURFACE DESCRIPTION TEFLON, POST USE

CURRENT ACTIVITY —

INSTRUMENT TYPE _____ I.D. NO. _____ TYPE _____ ID NO. _____

INSTRUMENT BASELINE _____

PROJECT QC: BACKGROUND MEASUREMENTS ☒ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS _____

CHAMBER I.D. H PHOTO TAKEN: Yes ☐ No ☒ _____

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☒ BARM PRESS _____

AMBIENT CONDITIONS: Sun ☐ P.Sun ☐ Cloudy ☐ DARK Wind at 5', ____ mph Wind at Seal, ____ mph

TEMP INDOOR RAIN: Yes ☐ No ☐ Comment _____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ _____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☐ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

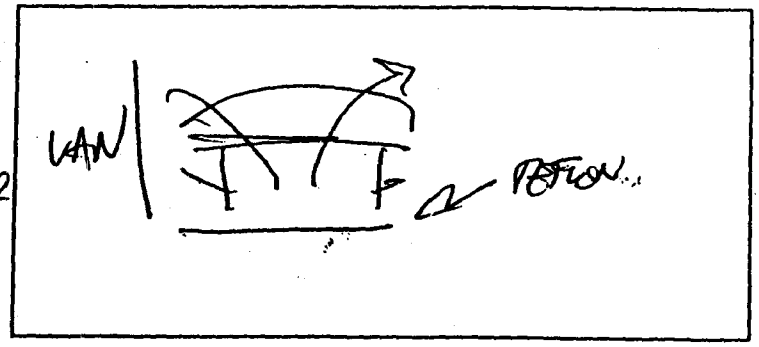
SWEEP AIR UHP CC BOTTLE SUPPLIER SM PSIG START 500 PSIG STOP _____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Ambient Surf	Ambient Air	Real-Time (ppmv) NA		Sample Number	Comments
1930	50	0								29
1936	↓	1								
1942		2								
1948	↓	3		NA						
1954		4								
2000		5							460	122-501-116
										FIELD BLK #2

COMMENTS:

INDOOR

SITE DIAGRAM



CES/STOCKDISK

ATTACHMENT B

CHAIN OF CUSTODY

[redacted]

Tetra Tech EM Inc.

(FOR SOIL BORING AND GROUNDWATER SAMPLES)

PROJECT NAME	PROJECT #
ALAMEDA POINT LANDFILLS	
SAMPLER(S) PRINTED NAME AND SIGNATURE	**SAMPLING TEAM #**
CESCHMIDT CESCHMIDT	NADIA BURLESON

THIS FORM IS FOR INTERNAL USE ONLY
DO NOT SEND TO LABORATORY
SEND TO PROJECT CHEMIST

SAMPLE I.D.	FIELD I.D.	COLLECTION DATE	SAMPLE TYPE*	POINT TYPE*	MATRIX*	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	SAMPLER'S INITIALS	SAMPLER'S COMPANY
122-S01-058D	SG-S01-B10-3	12/7/99	SPLIT	SB	SOIL GAS	4'	4'	IP	IP
122-S01-068D	SG-S01-B15-3	"	"	SB	"	4'	4'	IP	IP
122-S01-056D	SG-S01-B09-3	"	"	SB	"	4'	4'	IP	IP
122-S01-115	FLUX FIELD BLANK	"	TB	FLUX	AIR FLUX	N/A	N/A	CES	CES
122-S01-061	SG-S01-B12-0	12/8/99	REAL	"	"	↓	↓	↓	↓
122-S01-055	SG-S01-B09-0	"	REAL	"	"				
122-S01-103	SG-S01-B09-0-D	"	FB	"	"				
122-S01-059	SG-S01-B11-0	"	REAL	"	"				
122-S01-104	SG-S01-B11-0-D	"	FB	"	"				
122-S01-047	SG-S01-B05-0	"	REAL	"	"				

REMARKS:

INSTRUCTIONS: Complete all columns for each row you use. Enter only the codes listed below for columns containing and asterisk (*). Enter the three initials for the field sampler who collected the sample. Draw a vertical arrow down the column if an entry row applies to additional rows in the same column. Consult the project chemist for POINT NAMES prior to beginning field activities.

SAMPLE TYPE
- FB = Field Blank
- TB = Trip Blank
- ER = Equipment Rinsate
- DUP = Field Duplicate
- WC = Waste characterization
- Real = Real Sample
- (Note: For samples collected in triplicate for MS/MSD, place "Real/MS/MSD" in Sample Type)

POINT TYPE
- MW = Monitoring Well
- SB = Soil Boring
- TANK = Underground storage tank
- EXCV = Excavation pit
- MHSD = Storm drain manhole
- MHSS = Sanitary sewer manhole
- MHI = Industrial waste manhole
- QC = QC sample

MATRIX
- SOIL
- WATER
- SEDIMENT
- SLUDGE
- AIR
- SOIL GAS
- PRODUCT
- TISSUE
- PLANTS

(916) 852-8300
Tetra Tech EM Inc.

(FOR SOIL BORING AND GROUNDWATER SAMPLES)

PROJECT NAME	PROJECT #
ALAMEDA POINT LANDFILLS	
SAMPLER(S) PRINTED NAME AND SIGNATURE	**SAMPLING TEAM #**
CE SCHMIDT CESCHMIDT	BURGESON

THIS FORM IS FOR INTERNAL USE ONLY
DO NOT SEND TO LABORATORY
SEND TO PROJECT CHEMIST

SAMPLE I.D.	FIELD I.D.	COLLECTION DATE	SAMPLE TYPE*	POINT TYPE*	MATRIX*	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	SAMPLER'S INITIALS	SAMPLER'S COMPANY
122-S01-049	SG-S01-B06-0	12/8/99	REAL	FWX	AIR	MA	MA	CES	TES
122-S01-045	SG-S01-B04-0	↓	"	↓	↓	↓	↓	↓	↓
122-S01-039	SG-S01-B01-0		"						
122-S01-071	SG-S01-B17-0		"						
122-S01-077	SG-S01-B20-0		"						
122-S01-105	SG-S01-B11-C		LOWER POINT	FWX					
122-S01-079	SG-S01-B21-0		REAL						
122-S01-085	SG-S01-B24-0		"						
122-S01-089	SG-S01-B26-0		"						
122-S01-093	SG-S01-B28-0		"						

REMARKS:

INSTRUCTIONS: Complete all columns for each row you use. Enter only the codes listed below for columns containing and asterisk (*). Enter the three initials for the field sampler who collected the sample. Draw a vertical arrow down the column if an entry row applies to additional rows in the same column. Consult the project chemist for POINT NAMES prior to beginning field activities.

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- TB = Trip Blank
- ER = Equipment Rinsate
- DUP = Field Duplicate
- WC = Waste characterization
- Real = Real Sample
- (Note: For samples collected in triplicate for MS/MSD, place "Real/MS/MSD" in Sample Type)

POINT TYPE
- MW = Monitoring Well
- SB = Soil Boring
- TANK = Underground storage tank
- EXCV = Excavation pit
- MHSD = Storm drain manhole
- MHSS = Sanitary sewer manhole
- MHI = Industrial waste manhole
- QC = QC sample

MATRIX
- SOIL
- WATER
- SEDIMENT
- SLUDGE
- AIR
- SOIL GAS
- PRODUCT
- TISSUE
- PLANTS

Cali[redacted]5870
[redacted] 852-8300
Tetra Tech EM Inc.

(FOR SOIL BORING AN[redacted]ROUNDWATER SAMPLES)

PROJECT NAME	PROJECT #
ALAMEDA POINT LANDFILLS	
SAMPLER(S) PRINTED NAME AND SIGNATURE	**SAMPLING TEAM #**
CESCHMIDT CESCHMIDT	BURLESON

THIS FORM IS FOR INTERNAL USE ONLY
DO NOT SEND TO LABORATORY
SEND TO PROJECT CHEMIST

SAMPLE I.D.	FIELD I.D.	COLLECTION DATE	SAMPLE TYPE*	POINT TYPE*	MATRIX*	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	SAMPLER'S INITIALS	SAMPLER'S COMPANY
122-S01-117	FLUX BACKGROUND	12/8/99	REAL	FLUX	AIR	N/A	N/A	CES	CES
122-S01-095	SG-S01-B29-0	"	"	"	"	"	"	"	"
122-S01-099	SG-S01-B31-0	"	"	"	"	"	"	"	"
122-S01-116	FLUX BLANK	"	FB	"	"	"	"	"	"

REMARKS:

INSTRUCTIONS: Complete all columns for each row you use. Enter only the codes listed below for columns containing and asterisk (*). Enter the three initials for the field sampler who collected the sample. Draw a vertical arrow down the column if an entry row applies to additional rows in the same column. Consult the project chemist for POINT NAMES prior to beginning field activities.

SAMPLE TYPE
- FB = Field Blank
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- DUP = Field Duplicate
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- Real = Real Sample
- (Note: For samples collected in triplicate for MS/MSD, place "Real/MS/MSD" in Sample Type)

POINT TYPE
- MW = Monitoring Well
- SB = Soil Boring
- TANK = Underground storage tank
- EXCV = Excavation pit
- MHSD = Storm drain manhole
- MHSS = Sanitary sewer manhole
- MHI = Industrial waste manhole
- QC = QC sample

MATRIX
- SOIL
- WATER
- SEDIMENT
- SLUDGE
- AIR
- SOIL GAS
- PRODUCT
- TISSUE
- PLANTS

CHAIN OF CUSTODY RECORD

Tetra Tech EM Inc.
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670
(916) 852-8300 FAX (916) 852-8307

DATE	CHAIN OF CUSTODY NUMBER
12/8/99	3848
LABORATORY NUMBER	PAGE 1 OF 2

PROJECT NAME: Alameda Pt. Site 1	PROJECT MANAGER: N. Burlson
PROJECT NUMBER: 6969-122	TELEPHONE NUMBER: 916-853-7527
PROJECT LOCATION: Alameda Pt.	DESTINATION LABORATORY:
SAMPLER(S): Interphase	ADDRESS:
SAMPLER SIGNATURE(S):	CITY / STATE / ZIP:
SITE CONTACT/ TELEPHONE NUMBER: Joel Cohn 5102681571	LABORATORY TELEPHONE NUMBER:

REQUESTED ANALYSES

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX TYPE	NO./TYPE OF CONTAINERS	TURN AROUND TIME	Grain Size	ASTM D2850									REMARKS (GRAB, COMPOSITE, ETC.)
122501-124	12/7		Soil	1-tube		X	X									
122501-125	12/7					X	X									
122501-126	12/7					X	X									
122501-135	12/7					X	X									
122501-128	12/8					X	X									
122501-129	12/8					X	X									
122501-130	12/8					X	X									
122501-132	12/8					X	X									
122501-133	12/8					X	X									
122501-134	12/8					X	X									
122501-136	12/8					X	X									
122501-138	12/8					X	X									

SHIPPED VIA: AIRBILL #:

SPECIAL INSTRUCTIONS:

RELINQUISHED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME	RECEIVED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME
Joel Cohn	J. Cohn / Tetra Tech	12/8		C. SCHMIDT	Chuck Schmidt	12/8/99	1100
				RECEIVED AT LAB BY (PRINT AND SIGN):			

DISTRIBUTION: WHITE = LABORATORY YELLOW = PROJECT MANAGER PINK = FILE

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

1 OF 3

180 BLUE RAVINE ROAD, SUITE
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

Nº 024372

Page ___ of ___

Contact Person CESCHMIDT

Company SAME

Address 19200 LAKE OAK RD City RED BLUFF State CA Zip 96080

Phone # 530 529-4278 FAX -4579

Collected By: Signature CES

Project Info:

P.O. # ___

Project # ___

Project Name ___

Turn Around Time:

☒ Normal

☐ Rush ___ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
	122-501-099	12/9/99 1902	TO-14 VOCs + ASTM 1945 CH4	-29"	0"	
	122-501-116	" 2000	" / "			

Relinquished By: (Signature) Date/Time: CESCHMIDT 12/9/99 Print Name: CESCHMIDT

Relinquished By: (Signature) Date/Time: CESCHMIDT Received By: (Signature) Date/Time: AIR TOXICS 12/9/99 2200

Relinquished By: (Signature) Date/Time ___ Received By: (Signature) Date/Time ___

Notes: ppbV, ug/m3, FLUX ug/m2,min-1

Lab Use Only	Shipper Name	Air Bill #	Opened By	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
							Yes No None N/A	

Form 1293 rev. 06

CHAIN OF CUSTODY RECORD

Tetra Tech EM Inc.
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670
(916) 852-8300 FAX (916) 852-8307

DATE: 12/5/99 | CHAIN OF CUSTODY NUMBER: 3843
LABORATORY NUMBER: AIR TOXICS LTD | PAGE 1 OF 2

PROJECT NAME: ALAMEDA FT BASES	PROJECT MANAGER: ANDY ERICKSON
PROJECT NUMBER:	TELEPHONE NUMBER:
PROJECT LOCATION: ALAMEDA POINT LF	DESTINATION LABORATORY: AIR TOXICS LTD
SAMPLER(S): M SCHMIDT	ADDRESS: 180 BLUE RAVINE LD #130
SAMPLER SIGNATURE(S): M SCHMIDT	CITY: FOLSOM STATE: CA ZIP: 95630
SITE CONTACT/ TELEPHONE NUMBER: 99	LABORATORY TELEPHONE NUMBER: 916.985.1000

REQUESTED ANALYSES: TO-14 FOR VOCS; ASTM - NMS FOR CH4

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX TYPE	NO./TYPE OF CONTAINERS	TURN AROUND TIME	TO-14	ASTM	REMARKS (GRAB, COMPOSITE, ETC.)
122-SO1-058D	12/7	1420	AIR	6 LITER CAN	STANDARD	X	X	
122-SO1-063D	"	1441						
122-SO1-056D	"	1715						
122-SO1-115	"	1959						
122-SO1-061	12/8	0655						
122-SO1-055	"	0732						
122-SO1-103	"	0736	0744					
122-SO1-059	"	0826						
122-SO1-104	"	0832						
122-SO1-047	"	0926						
122-SO1-049	"	1014						

SHIPPED VIA: CARRIER CES | AIRBILL #:

SPECIAL INSTRUCTIONS: PLEASE REPORT ppbv, $\mu g/m^3$, FLUX ($\frac{\mu g}{m^2 \cdot min}$ FLUX = (0.0385 X ppbv))

RELINQUISHED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME	RECEIVED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME
M SCHMIDT	SCT	12/9/99	2200	AIR TOXICS	AIR TOXICS	12/10/99	2200
				RECEIVED AT LAB BY (PRINT AND SIGN):			

DISTRIBUTION: WHITE = LABORATORY YELLOW = PROJECT MANAGER PINK = FILE

CHAIN OF CUSTODY RECORD

Tetra Tech EM Inc.
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670
(916) 852-8300 FAX (916) 852-8357

DATE | CHAIN OF CUSTODY NO. 842
LABORATORY NUMBER | PAGE 2 OF 2

PROJECT NAME: MCAMEJA IT LANDFILLS	PROJECT MANAGER: [illegible]
PROJECT NUMBER	TELEPHONE NUMBER
PROJECT LOCATION: MCAMEJA POINT	DESTINATION LABORATORY: AIR TOXICS LTD
SAMPLER(S): CE SCHMIDT	ADDRESS: 180 BLUE RAVINE RD
SAMPLER SIGNATURE(S): CE SCHMIDT	CITY: FOLSOM STATE: CA ZIP: 95630
SITE CONTACT/ TELEPHONE NUMBER: 530, 529.4256	LABORATORY TELEPHONE NUMBER: 916. 985, 1000

REQUESTED ANALYSES

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX TYPE	NO./TYPE OF CONTAINERS	TURN AROUND TIME	TO-14 FOR VOCs	NCM 1975 FOR CH4									REMARKS (GRAB, COMPOSITE, ETC.)
122-SO1-045	12/8	1108	AIR	6 LITER CAN	STANDARD	X	X									
122-SO1-039	"	1205														
122-SO1-071	"	1300														
122-SO1-077	"	1350														
122-SO1-104	"	1436														
122-SO1-079	"	1520														
122-SO1-096	"	1558														
122-SO1-089	"	1641														
122-SO1-093	"	1717														
122-SO1-117	"	1746														
122-SO1-095	"	1830														

SHIPPED VIA: CARRIER CES AIRBILL #: _____

SPECIAL INSTRUCTIONS: Report ppbv, $\mu g/m^3$ FLUX = (0.0385)($\mu g/m^3$) = $\mu g/m^2, min^{-1}$

RELINQUISHED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME	RECEIVED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME
CE SCHMIDT	CE SCHMIDT	12/9/97	2200	AIR TOXICS	AIR TOXICS LTD	12/9/97	2200
				RECEIVED AT LAB BY (PRINT AND SIGN):			

DISTRIBUTION: WHITE = LABORATORY YELLOW = PROJECT MANAGER PINK = FILE

ATTACHMENT C

LABORATORY DATA REPORTS

LABORATORY NARRATIVE
Analysis of Volatile Organic Compounds by EPA Method TO-14
Tetra Tech
Work Order # 9912176A

Eleven 6L Summa Canister samples were received on December 8, 1999. The laboratory performed analysis via EPA Methods TO-14/TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	*TO-14/TO-14a*	*TO-15*	*Air Toxics Ltd. Modification*
Concentration of internal standard spike	Not specified	10 ppbv	25 - 50 ppbv
Dilutions for initial calibration	Dynamic or static dilutions using canisters	Dynamic or static dilutions using canisters	Syringe and flow controller dilutions
Internal standard recoveries	Not specified	Within 40% of mean of calibration curve for blanks, and within 40% of daily CCV for samples	Within 40% of the daily CCV internal standard area for blanks and samples
Internal standard retention times	Not specified	Within 0.33 minutes from most recent calibration	Within 0.50 minutes of most recent daily CCV internal standards
Initial calibration criteria	Not specified	RSD of 30% or less	RSD of 30% or less for standard compounds, 40% or less for non-standard and polar compounds
Continuing calibration verification criteria	Not specified	70 - 130%	70 - 130% for at least 90% of standard compounds, 60 - 140% for at least 80% of non-standard and polar compounds
Response factor for quantitation	Average response factor (ICAL)	Daily response factor (CCV)	Average response factor (ICAL)

The recovery of surrogate Bromofluorobenzene in sample 122-S01-56D was outside control limits due to high level hydrocarbon matrix interference. The un-subtracted raw spectra is provided to confirm the presence of hydrocarbon interference. Data is reported as qualified.

Dilution was performed on sample 122-S01-058D due to the presence of high level non-target species.

There were no other out of the ordinary circumstances to report.

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J - Estimated value.
- E - Exceeds instrument calibration range.

LABORATORY NARRATIVE
Analysis of Volatile Organic Compounds by EPA Method TO-14
Tetra Tech
Work Order # 9912176B

Thirteen 6L Summa Canister samples were received on December 8, 1999. The laboratory performed analysis via EPA Methods TO-14/TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	*TO-14/TO-14a*	*TO-15*	*Air Toxics Ltd. Modification*
Concentration of internal standard spike	Not specified	10 ppbv	25 - 50 ppbv
Dilutions for initial calibration	Dynamic or static dilutions using canisters	Dynamic or static dilutions using canisters	Syringe and flow controller dilutions
Internal standard recoveries	Not specified	Within 40% of mean of calibration curve for blanks, and within 40% of daily CCV for samples	Within 40% of the daily CCV internal standard area for blanks and samples
Internal standard retention times	Not specified	Within 0.33 minutes from most recent calibration	Within 0.50 minutes of most recent daily CCV internal standards
Initial calibration criteria	Not specified	RSD of 30% or less	RSD of 30% or less for standard compounds, 40% or less for non-standard and polar compounds
Continuing calibration verification criteria	Not specified	70 - 130%	70 - 130% for at least 90% of standard compounds, 60 - 140% for at least 80% of non-standard and polar compounds
Response factor for quantitation	Average response factor (ICAL)	Daily response factor (CCV)	Average response factor (ICAL)

There were no out of the ordinary circumstances to report.

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J - Estimated value.
- E - Exceeds instrument calibration range.
- S - Saturated Peak.
- Q - Exceeds quality control limits.
- U - Compound analyzed for but not detected above the reporting limit.
- N - The identification is based on presumptive evidence.

S - Saturated Peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
N - The identification is based on presumptive evidence.

APPENDIX F

AP ENGINEERING & TESTING, INC.

LETTER OF TRANSMITTAL

TO: Michael Orbanosky	FROM: Andrew Phukunhaphan
COMPANY: Tetra Tech EM Inc.	DATE: 1/18/00
ADRRESS: 10670 White Rock Road, Suite 100	TOTAL NO. OF PAGES TRANSMITTED 1
CITY AND STATE: Rancho Cordova, CA 95670	YOUR PROJECT NAME: Alameda Pt. 1 Site
	YOUR PROJECT NUMBER: G0069-122

☐ AS REQUESTED ☐ FOR YOUR REVIEW & COMMENT ☐ FOR YOUR USE

NOTES/COMMENTS:

Dear Mike:

Transmitted herewith please find lab results of grain size analyses and direct shear tests. Upon grain size analyses, we found tested samples to be coarse-grained soils which are not suitable for unconsolidated undrained triaxial tests as requested. In order to determine shear strength of coarse-grained soils, direct shear test is suitable. We have informed you for this change and faxed to you the ASTM test procedure earlier. Based on soil friction angle and cohesion, we then could calculate the load bearing capacity of the soils using Terzaghi's equation.

Thank you for the opportunity to be of service to you.

2603 POMONA BLVD, POMONA, CA 91768
TEL 909-869-6316 FAX 909-869-6318

CHAIN OF CUSTODY RECORD

Tetra Tech EM Inc.
10670 White Rock Road, Suite 100
Rancho Cordova, CA 95670
(916) 852-8300 FAX (916) 852-8307

DATE	CHAIN OF CUSTODY NUMBER
12/8/99	No. 3848
LABORATORY NUMBER: 99-1209	PAGE 1 OF 2

PROJECT NAME: Alameda Pt. Site 1	PROJECT MANAGER: N. Burlson
PROJECT NUMBER: G0069-122	TELEPHONE NUMBER: 916-853-4527
PROJECT LOCATION: Alameda Pt.	DESTINATION LABORATORY: FAX 916-852-0307
SAMPLER(S): Interphase	ADDRESS:
SAMPLER SIGNATURE(S):	CITY STATE ZIP
SITE CONTACT/ TELEPHONE NUMBER: Joel Cohn 5162681571	LABORATORY TELEPHONE NUMBER:

REQUESTED ANALYSES

Grain Size
VOC's
ASTM D2850

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX TYPE	NO/TYPE OF CONTAINERS	TURN AROUND TIME	REMARKS (GRAB, COMPOSITE, ETC.)
122-501-124	12/7		SOIL	1-tube		
122501-125	12/7				1*	
122501-126	12/7					
122501-135	12/7					
122501-128	12/8					
122501-129	12/8					
122501-130	12/8					
122501-132	12/8					
122501-133	12/8					
122501-134	12/8					
122501-136	12/8					
122501-138	12/8					

SHIPPED VIA:

AIRBILL #:

SPECIAL INSTRUCTIONS:

RELINQUISHED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME	RECEIVED BY (SIGNATURE)	PRINT NAME/ COMPANY	DATE	TIME
Joel Cohn	J. Cohn / Tetra Tech	12/8		C SCHMIDT	Chuck Schmidt	12/8/99	1900
					SERGE YENDA	12/9/99	2:00PM
				RECEIVED AT LAB BY (PRINT AND SIGN):			

DISTRIBUTION: WHITE = LABORATORY YELLOW = PROJECT MANAGER PINK = FILE

* CALCULATE LOAD BEARING COMPACTION

Geotechnical Properties

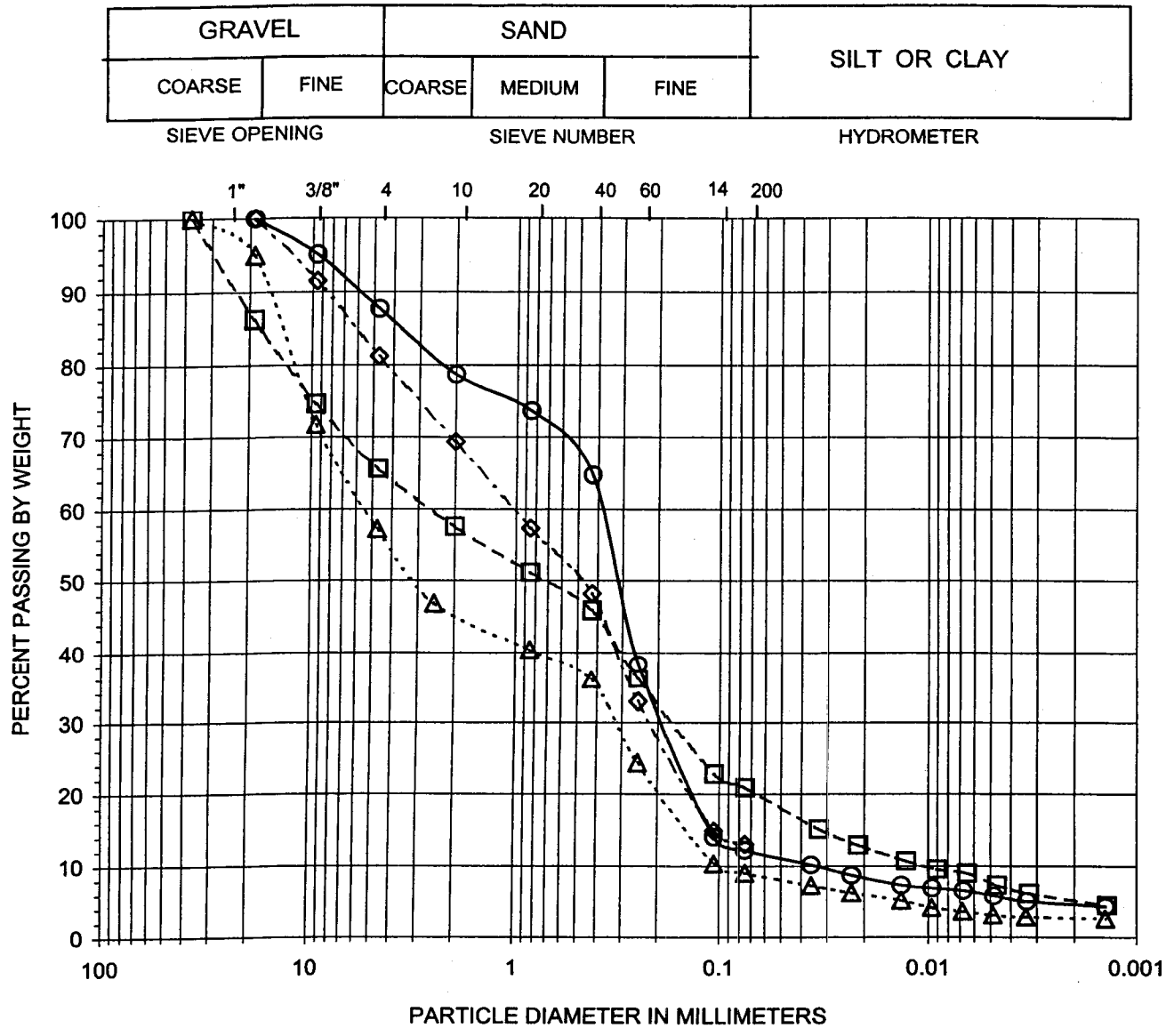
Project: Alameda Pt. Site 1

AP No.: 99-1219

Chain Of Custody Numbers: 3848

Sample ID	Grain Size %pass 200 sieve	Soil Type	Moisture Content (%)	Dry Density lbs./cu.ft	Bulk Density lbs./cu.ft	Direct Shear Test Results				Allowable Bearing Capacity (lb/ft²)
						Peak		Ultimate		
						C	Degrees	C	Degrees	
122S01-124	12.3	SM	8.10	105.10	NA	NA	NA	300	24	2664
122S01-125	20.9	SM	8.00	114.00	NA	100	33	100	31	2352
122S01-126	9.0	SP-SM	6.10	104.20	NA	100	31	100	29	1823
122S01-128	13.1	SM	4.60	96.30	NA	50	31	50	30	1341
122S01-129	8.8	SP-SM	3.70	117.50	NA	400	32	250	32	4759
122S01-130	14.4	SM	5.70	108.80	NA	NA	NA	250	27	2982
122S01-132	15.4	SM	11.10	100.00	NA	150	28	100	27	1502
122S01-133	14.9	SM	9.00	106.40	NA	200	37	100	37	4599
122S01-134	9.4	SP-SM	9.00	101.40	NA	250	28	150	28	2164
122S01-135	7.5	SP-SM	4.60	114.30	NA	250	28	100	28	1701
122S01-136	8.4	SP-SM	6.70	105.80	NA	200	30	150	29	2399
122S01-138	14.0	SM	7.70	114.40	NA	150	30	150	29	2463

NOTE: Allowable Bearing Capacity was calculated base on Terzaghi method with safety factor of 4.



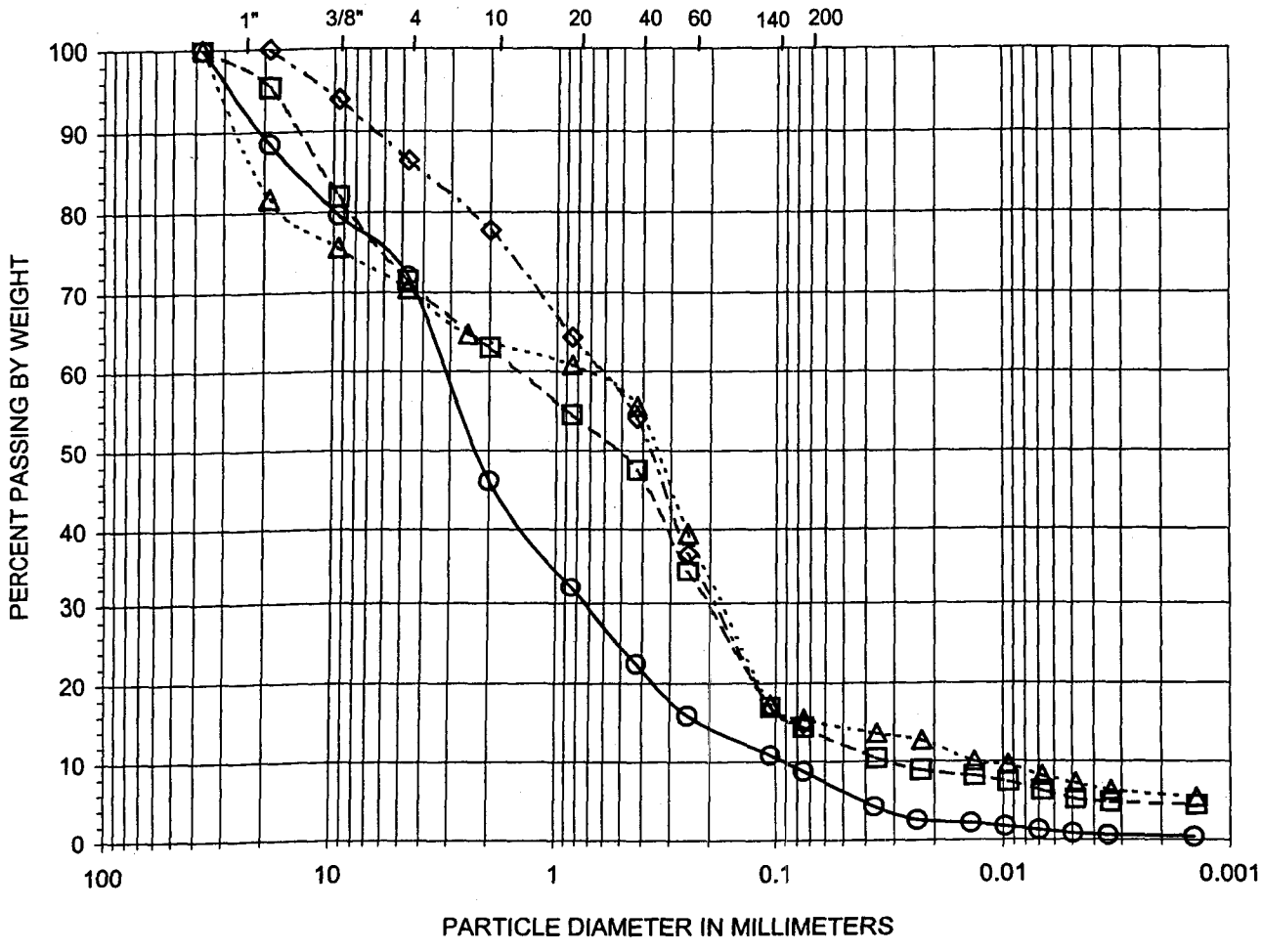
Symbol	Sample Identification	Sample Depth (feet)	Percent Passing No. 200 Sieve	Soil Type
○	122S01-124		12.3	SM
□	122S01-125		20.9	SM
△	122S01-126		9.0	SP-SM
◇	122S01-128		13.1	SM

GRAIN SIZE DISTRIBUTION CURVE

ASTM D 422

Project Name: Alameda Pt. Site 1
Project No.: G0069-122
Date: 1/14/00
AP No: 99-1219 **Signed By:**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	
SIEVE OPENING		SIEVE NUMBER			HYDROMETER



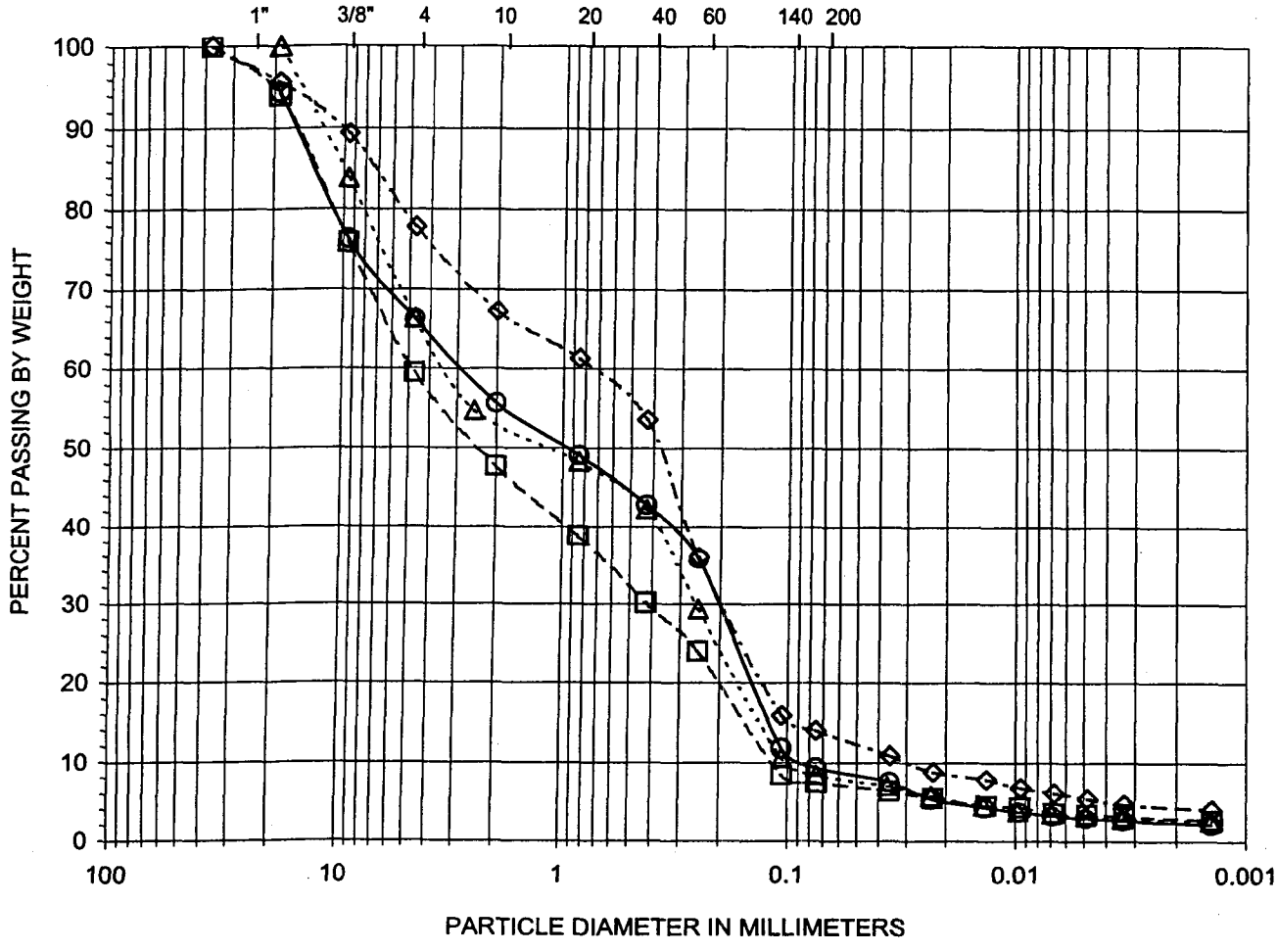
Symbol	Sample Identification	Sample Depth (feet)	Percent Passing No. 200 Sieve	Soil Type
○	122S01-129		8.8	SP-SM
□	122S01-130		14.4	SM
△	122S01-132		15.4	SM
◇	122S01-133		14.9	SM

GRAIN SIZE DISTRIBUTION CURVE

ASTM D 422

Project Name: Alameda Pt. Site 1
Project No.: G0069-122
Date: 1/14/00
AP No: 99-1219 **Signed By:**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	
SIEVE OPENING		SIEVE NUMBER			HYDROMETER

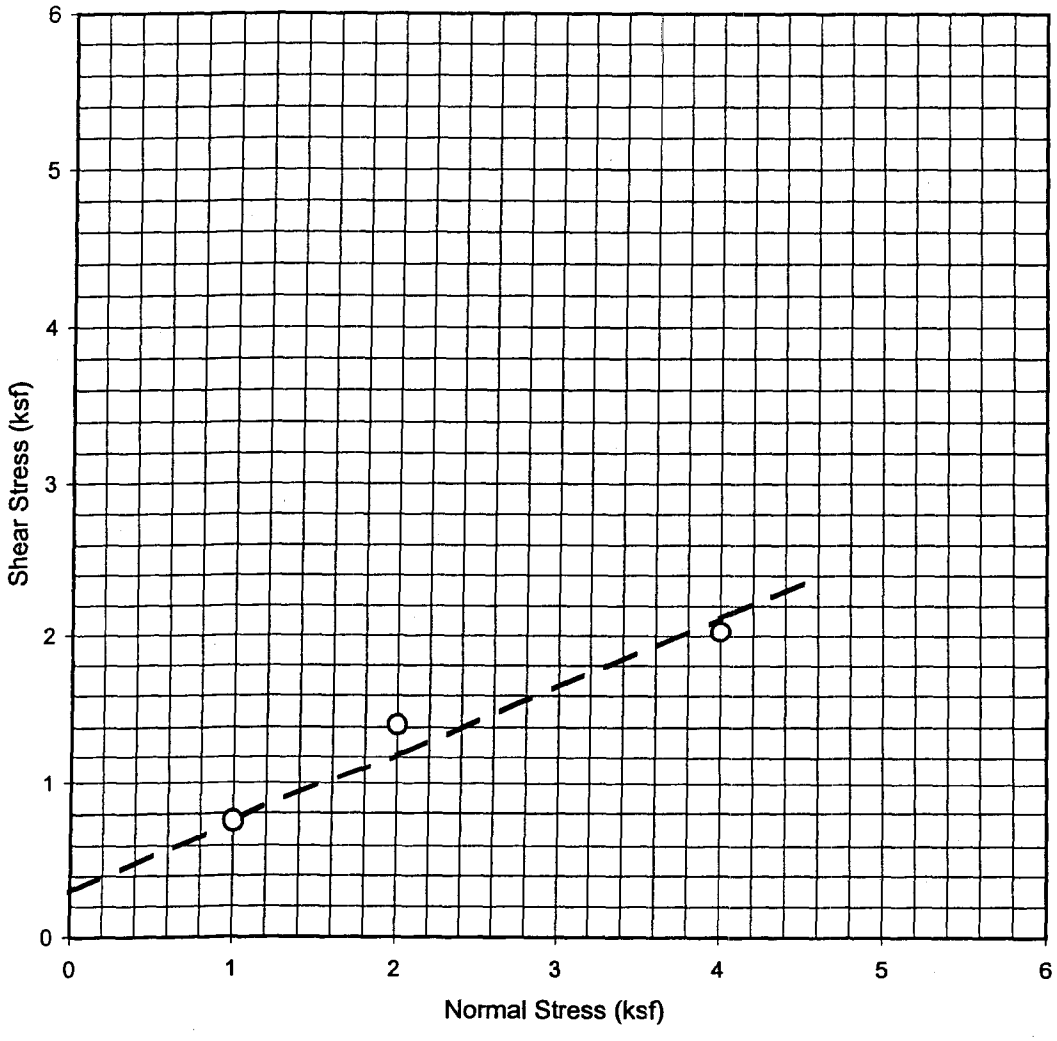


Symbol	Sample Identification	Sample Depth (feet)	Percent Passing No. 200 Sieve	Soil Type
○	122S01-134		9.4	SP-SM
□	122S01-135		7.5	SP-SM
△	122S01-136		8.4	SP-SM
◇	122S01-138		14.0	SM

GRAIN SIZE DISTRIBUTION CURVE

ASTM D 422

Project Name: Alameda Pt. Site 1
Project No.: G0069-122
Date: 1/14/00
AP No: 99-1219 **Signed By:**



Project Name:	:	Alameda Pt. Site 1	
Project No.	:	G0069-122	
Boring No.	:	122S01	
Sample No.	:	124	
Depth (ft)	:	-	
Sample Type	:	Remolded to original density	
Soil Type	:	Drk Brown Silty Sand w/ gravel	
Test Condition	:	Saturated	
Initial Dry Density	:	105.1	pcf
Moisture Content (before)	:	8.1	%
Moisture Content (after)	:	17.0	%

INTERPRETED STRENGTH DATA

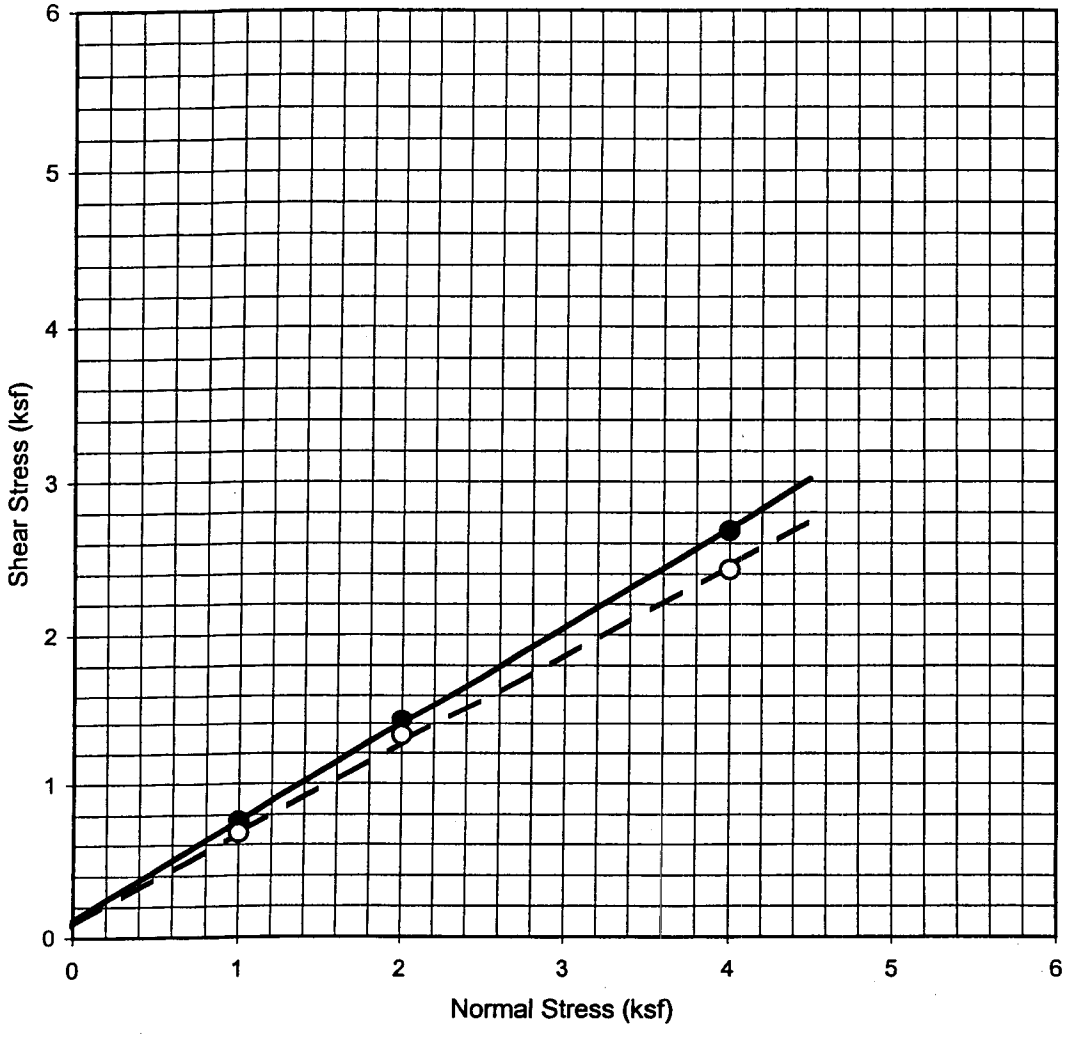
	Peak	Ultimate
COHESION (PSF) :		300
FRICTION ANGLE :		24 °

AP ENGINEERING AND TESTING, INC.

Alameda 124

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	125
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand
Test Condition	:	Saturated
Initial Dry Density	:	114.0 pcf
Moisture Content (before)	:	8.0 %
Moisture Content (after)	:	18.4 %

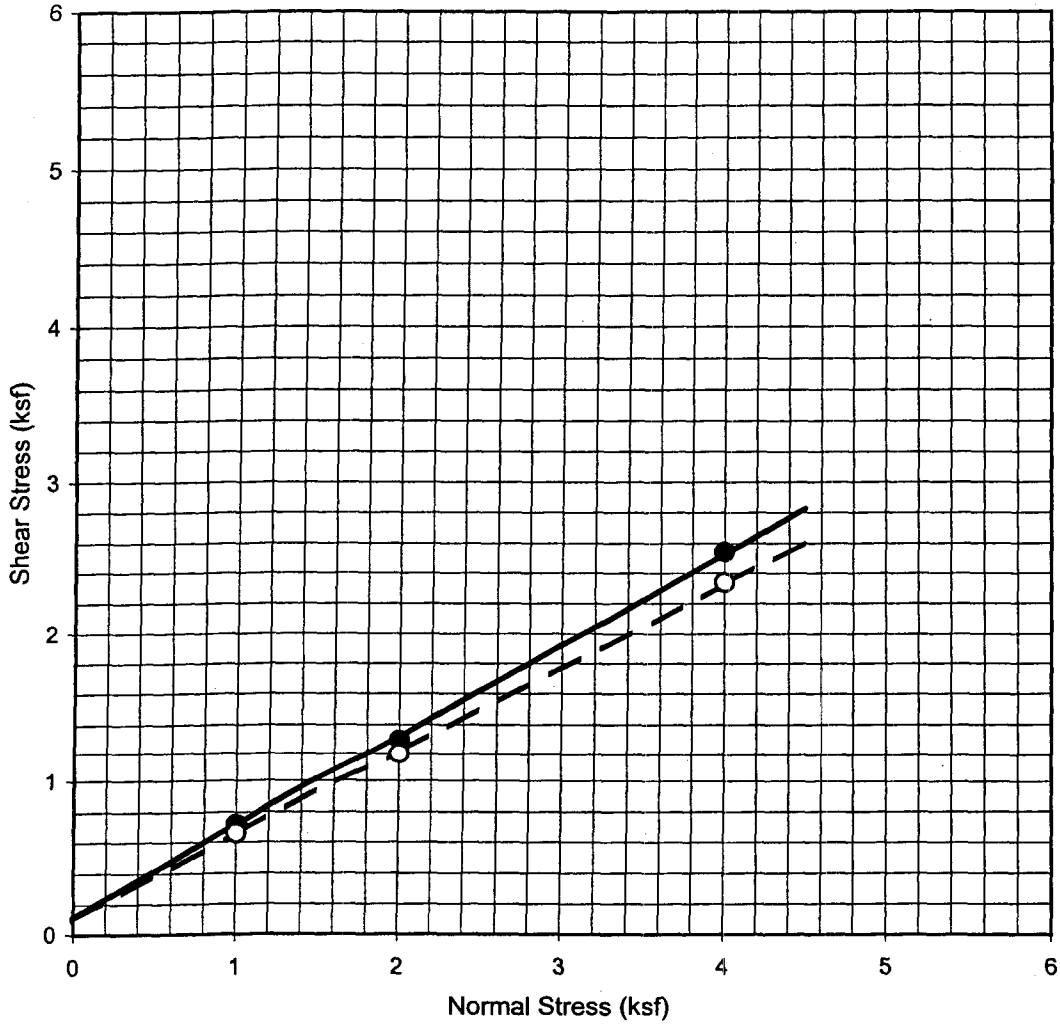
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	100	100
FRICTION ANGLE :	33 °	31 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	126
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	104.2 pcf
Moisture Content (before)	:	6.1 %
Moisture Content (after)	:	18.7 %

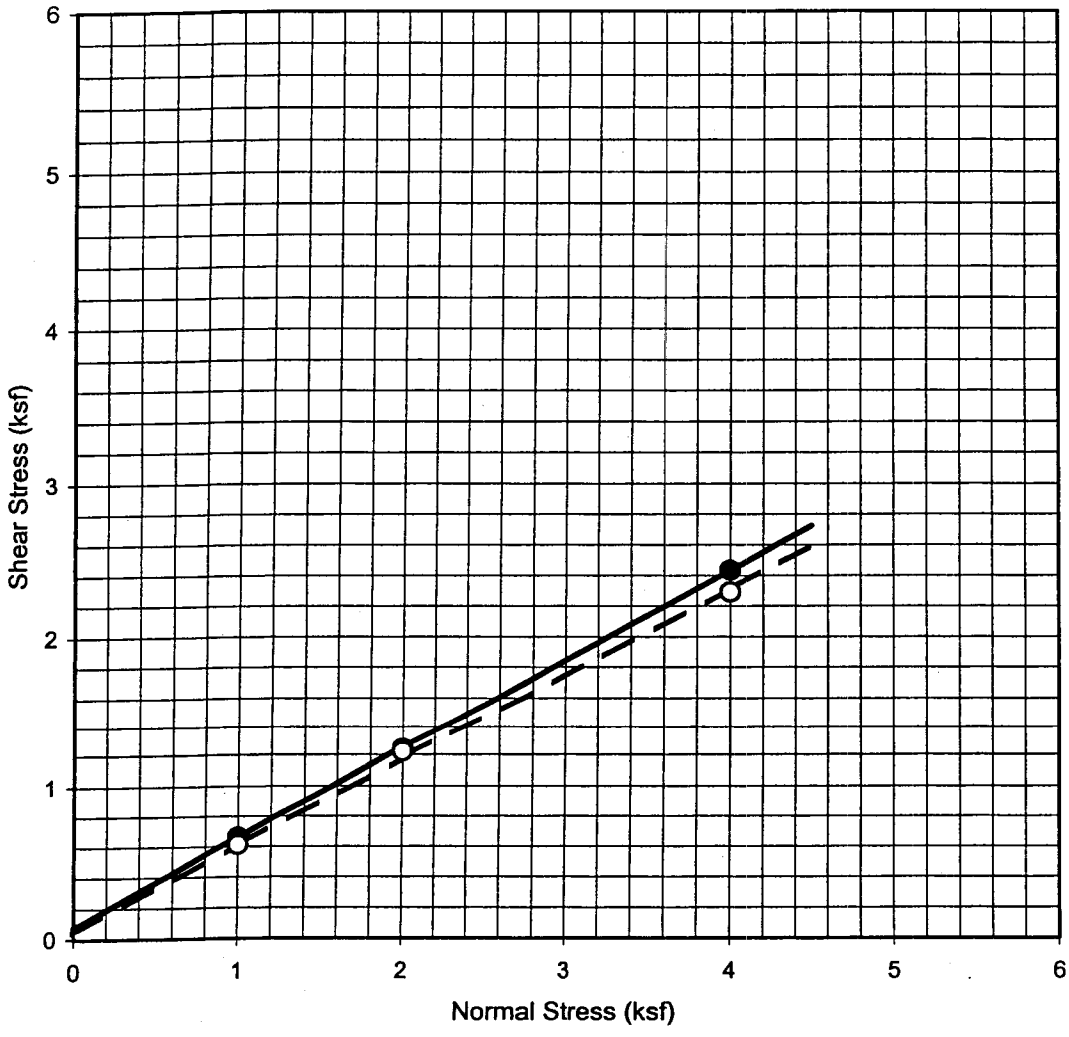
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	100	100
FRICTION ANGLE :	31 °	29 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1	
Project No.	:	G0069-122	
Boring No.	:	122S01	
Sample No.	:	128	
Depth (ft)	:	-	
Sample Type	:	Remolded to original density	
Soil Type	:	Drk Brown Silty Sand w/ gravel	
Test Condition	:	Saturated	
Initial Dry Density	:	96.3	pcf
Moisture Content (before)	:	4.6	%
Moisture Content (after)	:	16.8	%

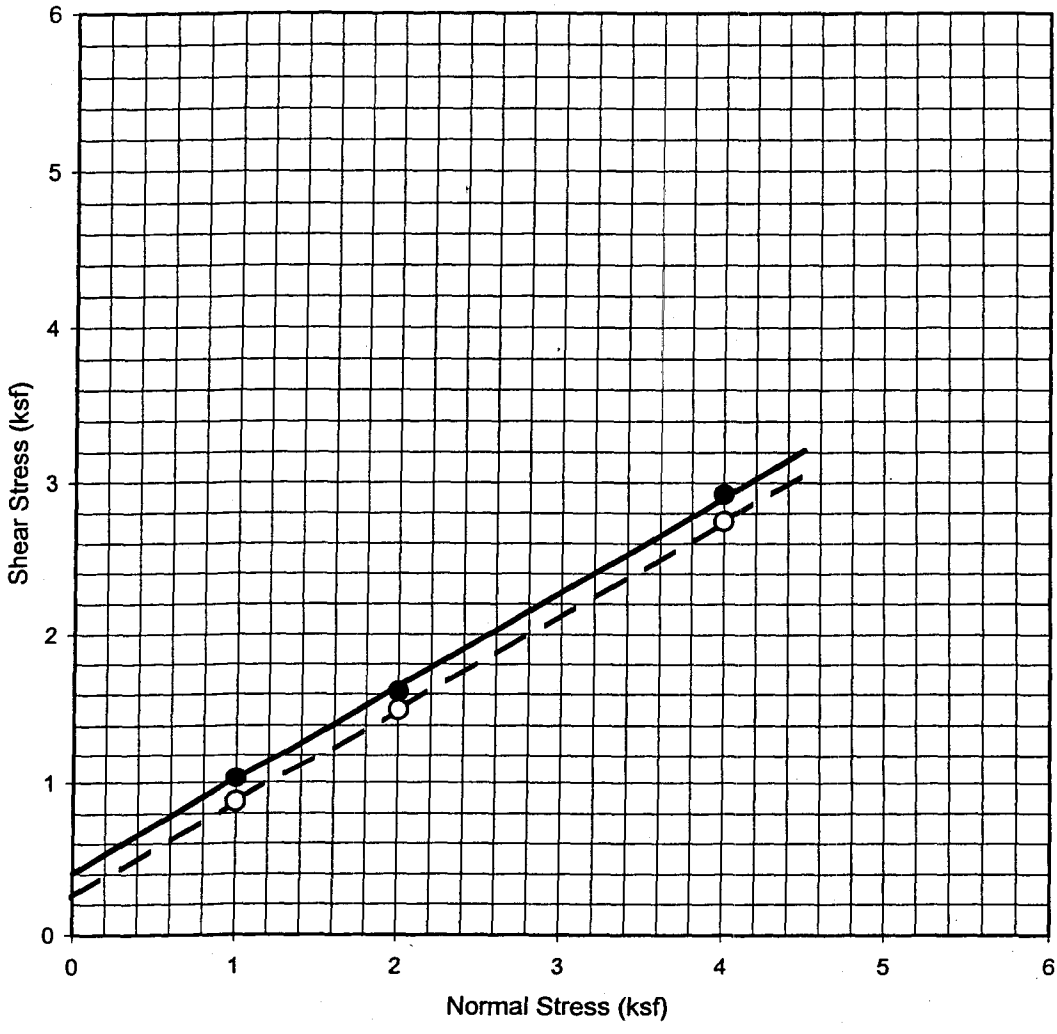
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	50	50
FRICTION ANGLE :	31 °	30 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	129
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	117.5 pcf
Moisture Content (before)	:	3.7 %
Moisture Content (after)	:	13.0 %

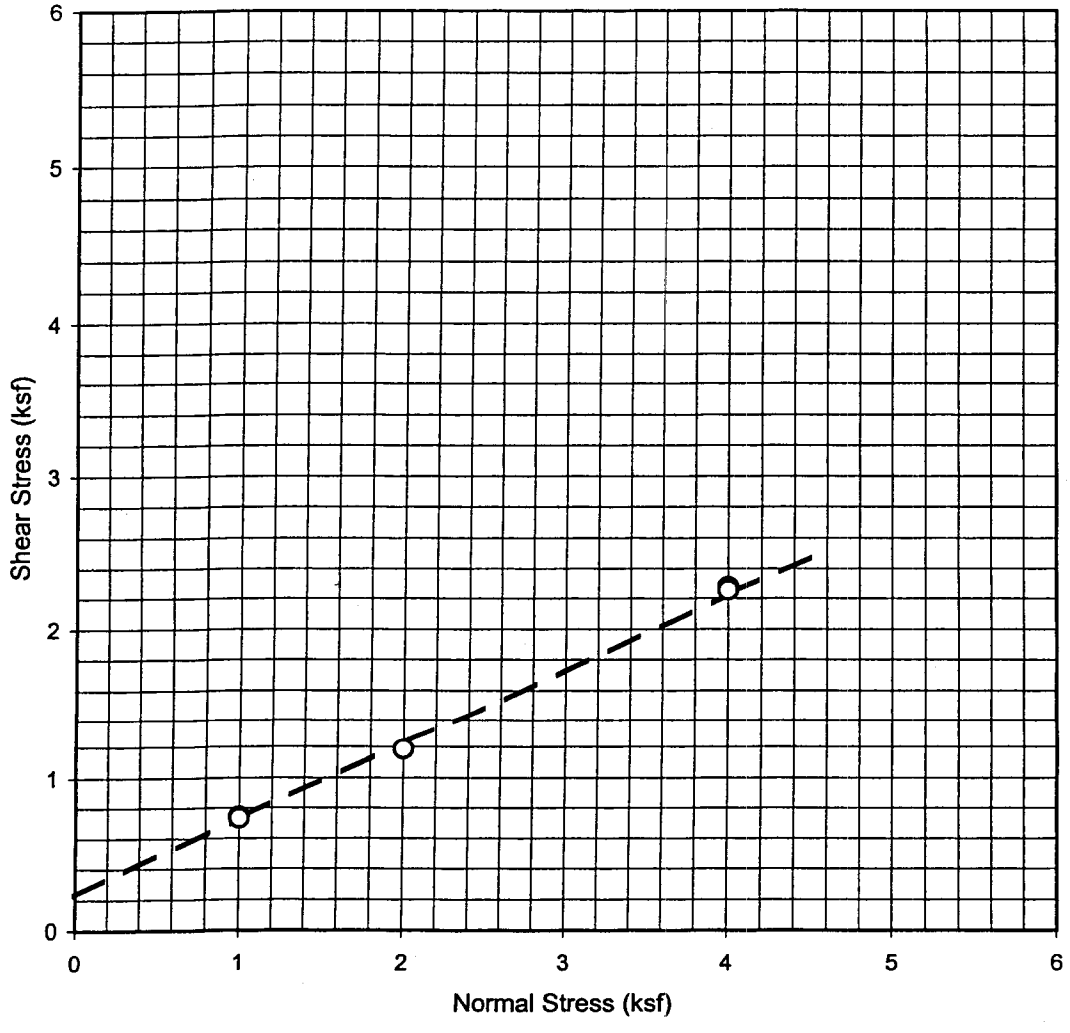
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	400	250
FRICTION ANGLE :	32 °	32 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	130
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	108.8 pcf
Moisture Content (before)	:	5.7 %
Moisture Content (after)	:	16.8 %

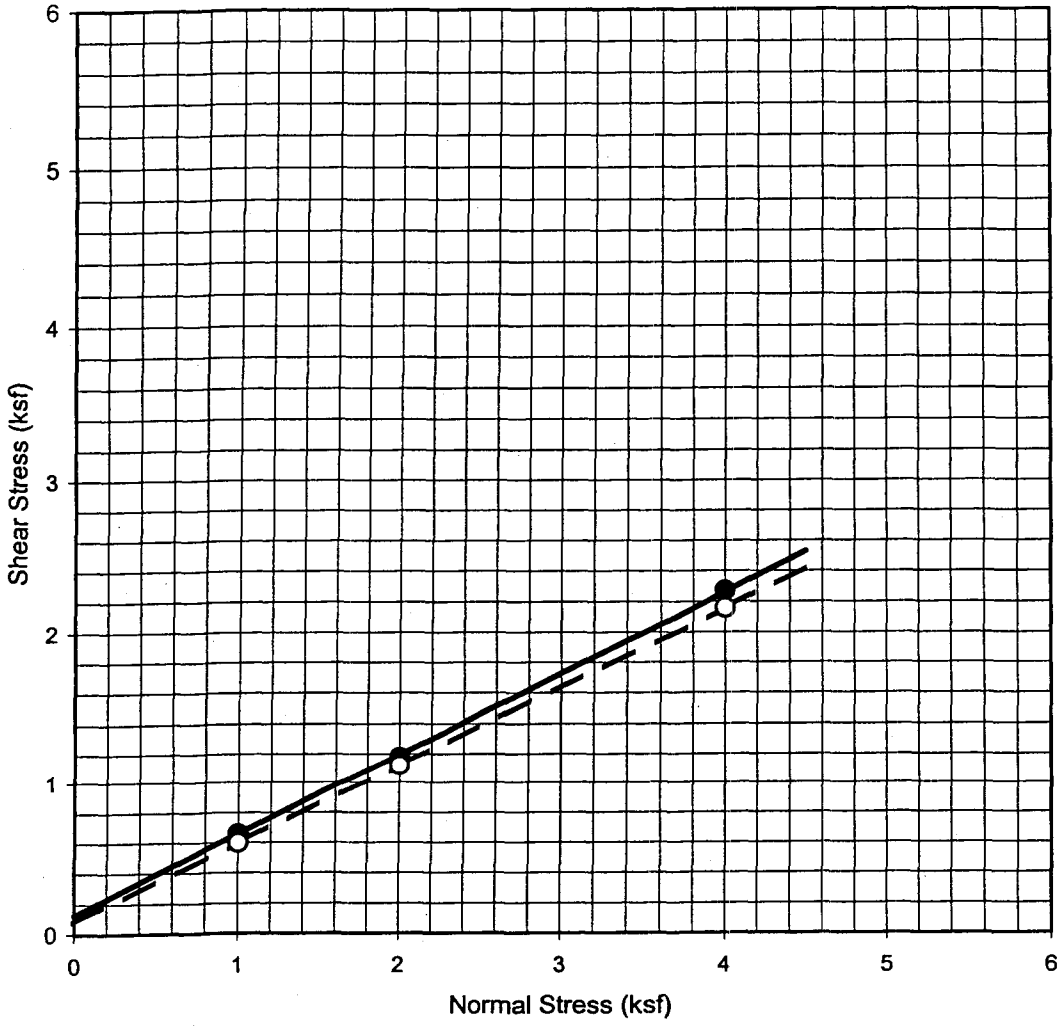
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :		250
FRICTION ANGLE :		27 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	132
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	100.0 pcf
Moisture Content (before)	:	11.1 %
Moisture Content (after)	:	20.1 %

INTERPRETED STRENGTH DATA

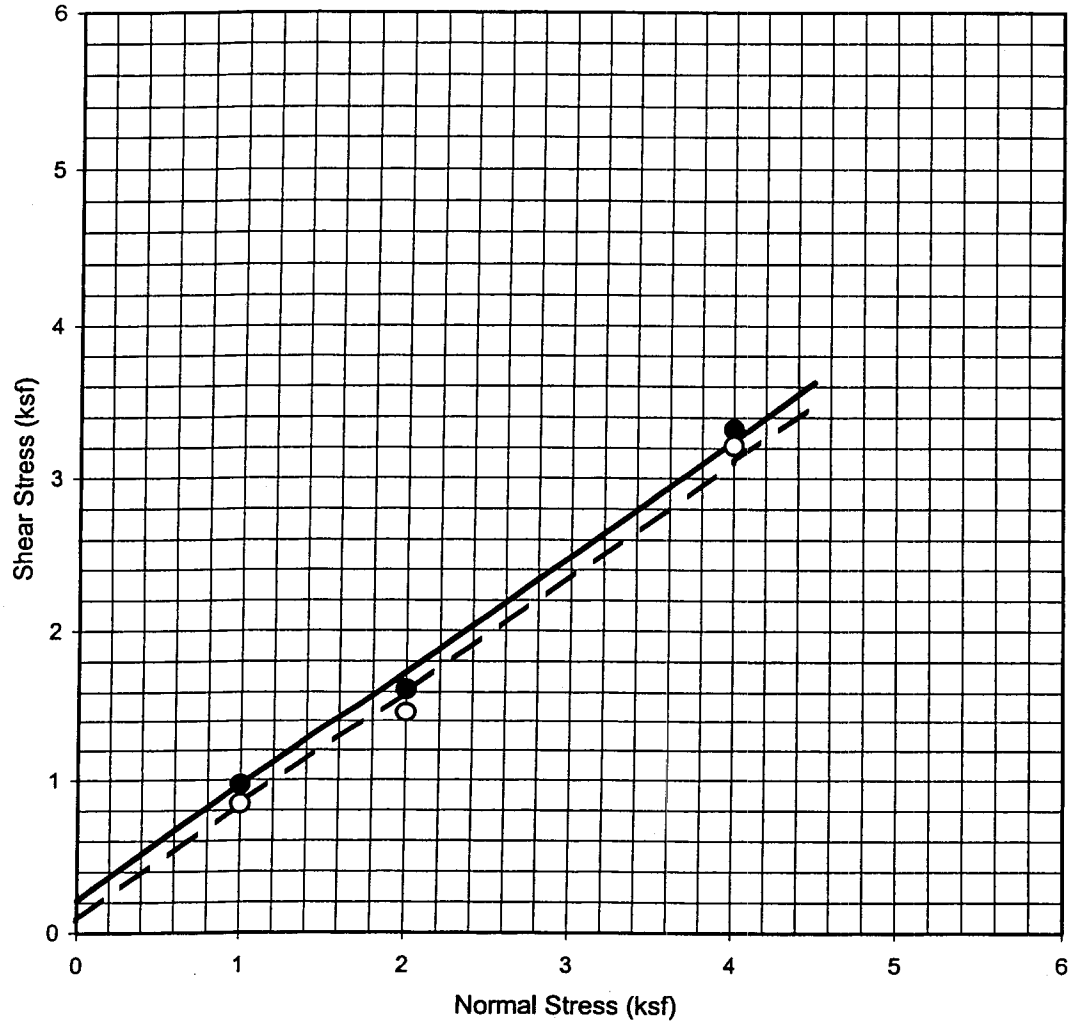
	Peak	Ultimate
COHESION (PSF) :	150	100
FRICTION ANGLE :	28 °	27 °

AP ENGINEERING AND TESTING, INC.

Alameda 132

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	133
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	106.4 pcf
Moisture Content (before)	:	9.0 %
Moisture Content (after)	:	22.2 %

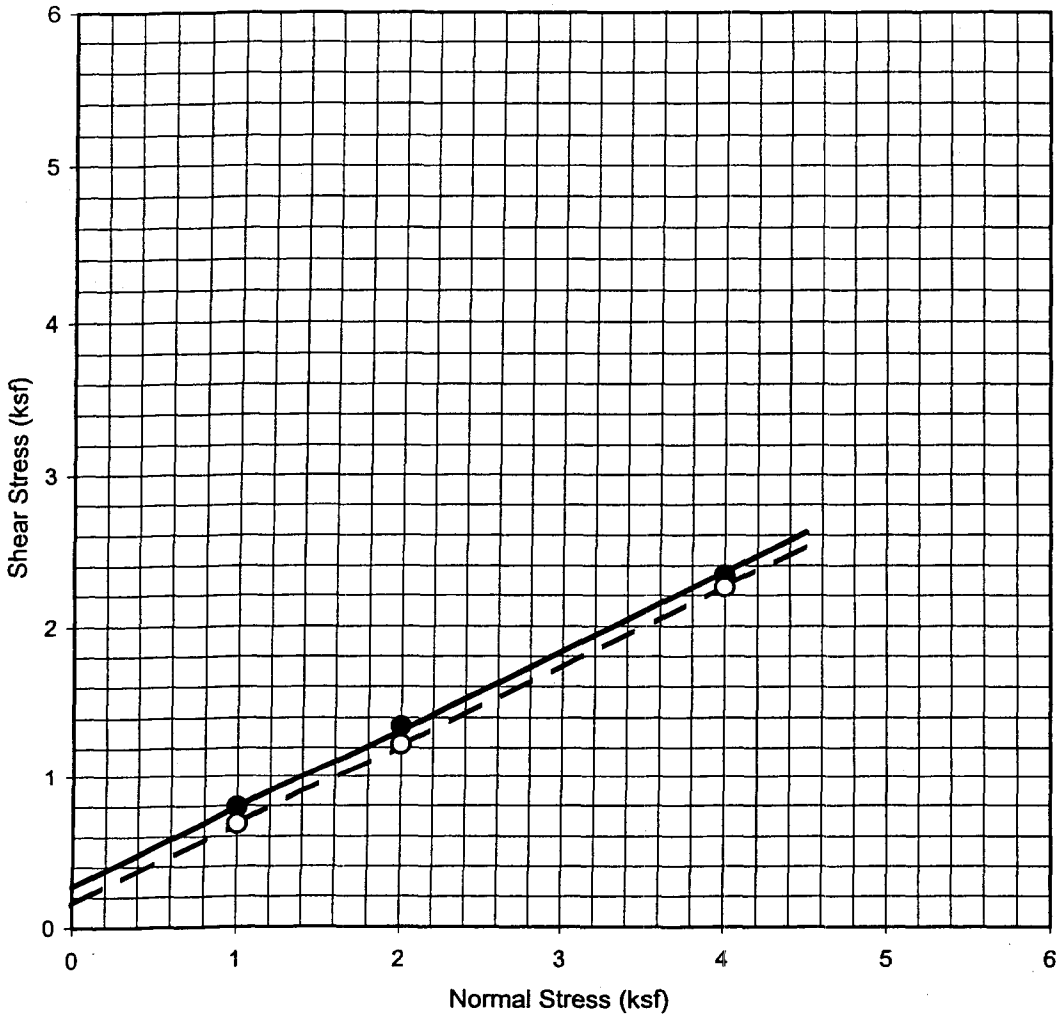
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	200	100
FRICTION ANGLE :	37 °	37 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	134
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	101.4 pcf
Moisture Content (before)	:	9.0 %
Moisture Content (after)	:	22.2 %

INTERPRETED STRENGTH DATA

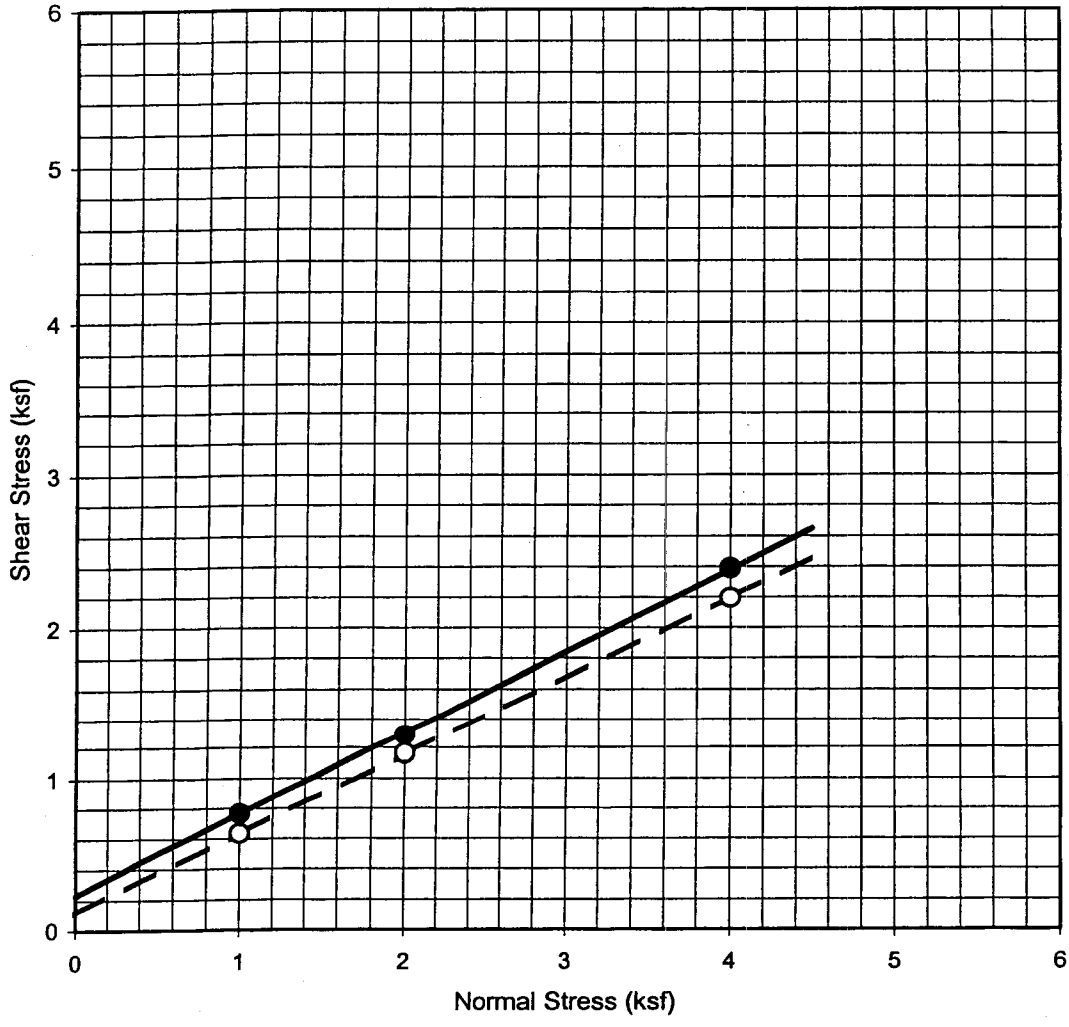
	Peak	Ultimate
COHESION (PSF) :	250	150
FRICTION ANGLE :	28 °	28 °

AP ENGINEERING AND TESTING, INC.

Alameda 134

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	135
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	114.3 pcf
Moisture Content (before)	:	4.6 %
Moisture Content (after)	:	17.5 %

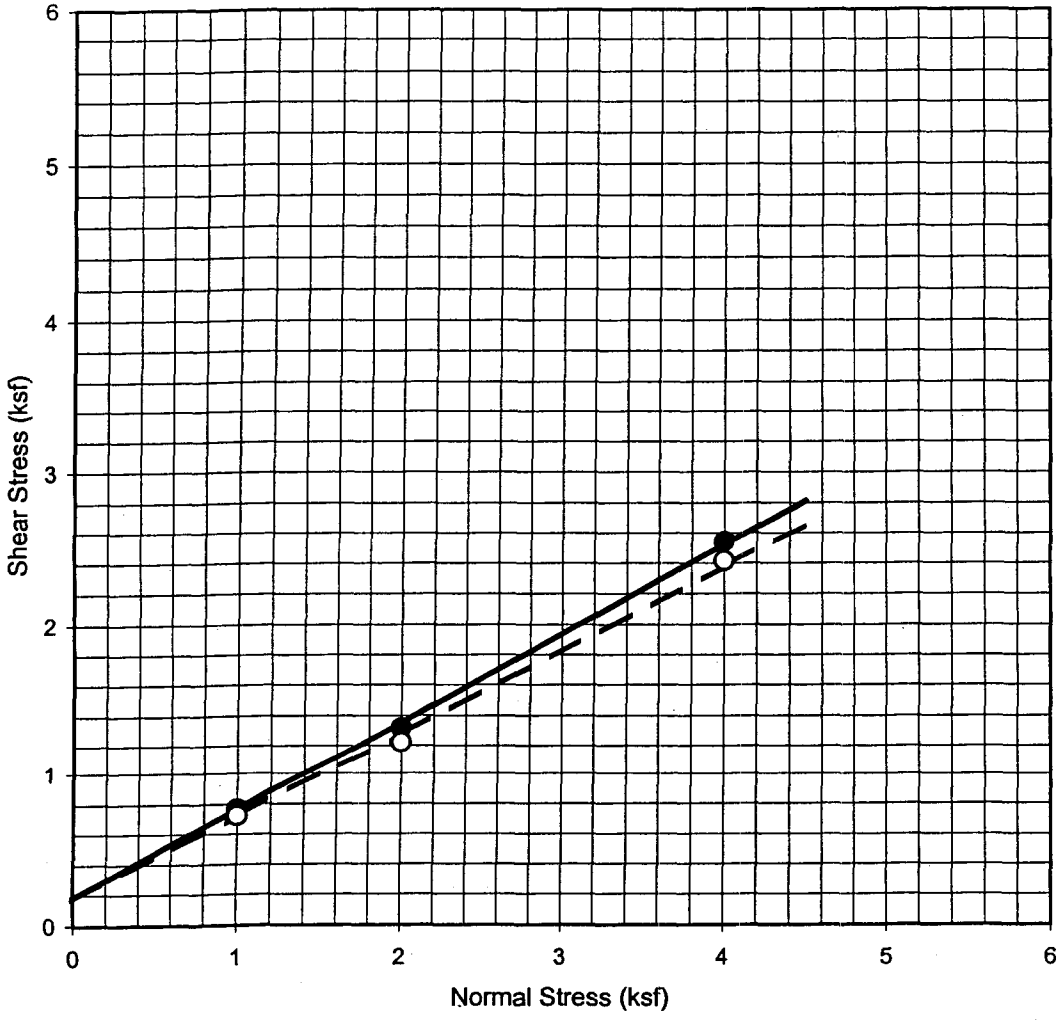
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	250	100
FRICTION ANGLE :	28 °	28 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	136
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	105.8 pcf
Moisture Content (before)	:	6.7 %
Moisture Content (after)	:	19.8 %

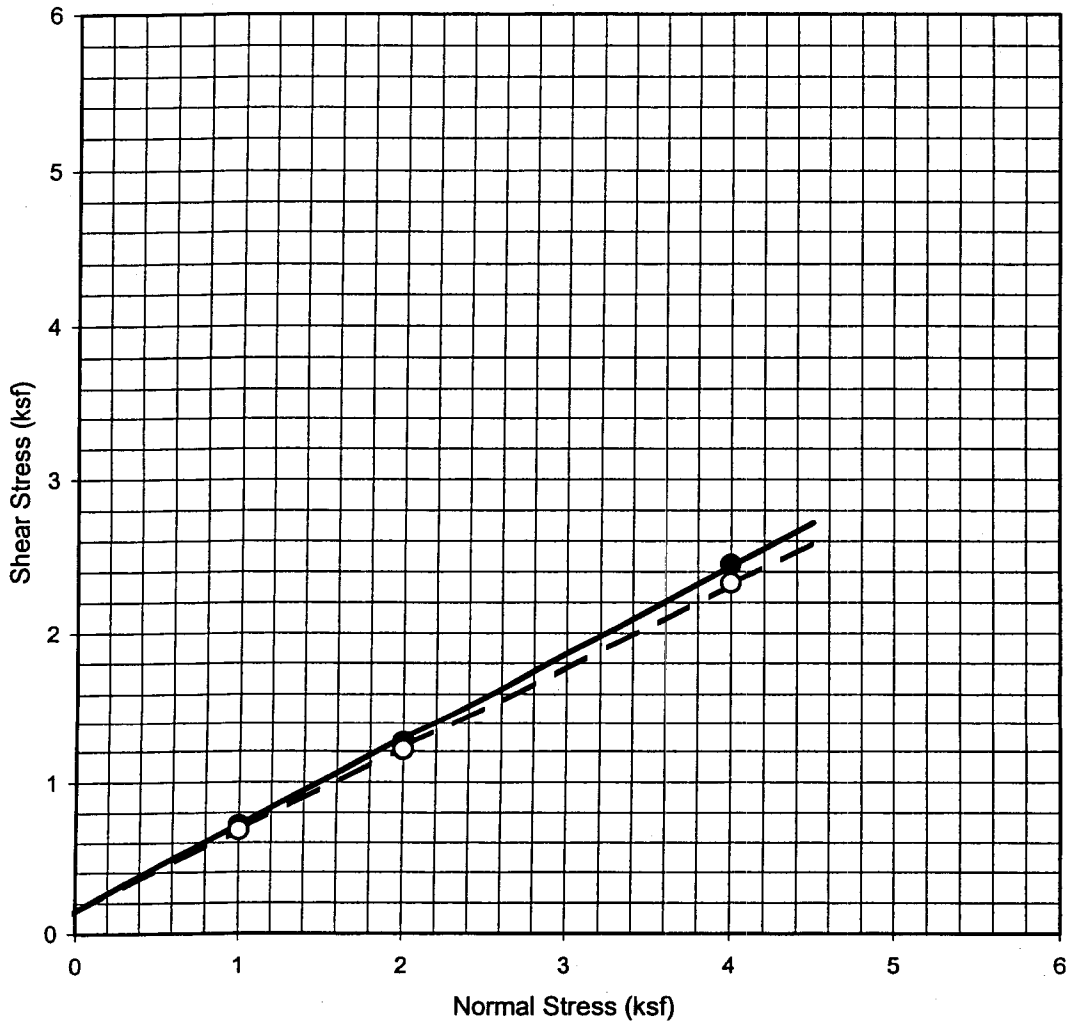
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	200	150
FRICTION ANGLE :	30 °	29 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.



Project Name:	:	Alameda Pt. Site 1
Project No.	:	G0069-122
Boring No.	:	122S01
Sample No.	:	138
Depth (ft)	:	-
Sample Type	:	Remolded to original density
Soil Type	:	Drk Brown Silty Sand w/ gravel
Test Condition	:	Saturated
Initial Dry Density	:	114.4 pcf
Moisture Content (before)	:	7.7 %
Moisture Content (after)	:	16.1 %

INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	150	150
FRICTION ANGLE :	30 °	29 °

AP ENGINEERING AND TESTING, INC.

DIRECT SHEAR
TEST RESULTS
(ASTM D 3080)

Jan-00 Figure No.

FTGBC Version 1.0 (c) 1994 by Prentice Hall, Inc.
Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:32 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	300	lb/ft2
Soil Friction Angle	=	24	deg
Soil Unit Weight	=	114.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	2693	3302	2990
Net	2664	3273	2961

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
2.7	3.3	3.0

FTGBC Version 1.0 (c) 1994 by Prentice Hall, Inc.
Bearing Capacity Analysis of Spread Footings

Title: Alameda

Unit System: English Date: ********** Time: 02:16 PM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	100	lb/ft2
Soil Friction Angle	=	31	deg
Soil Unit Weight	=	123.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	2383	3217	2768
Net	2352	3186	2737

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
2.4	3.2	2.7

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English
(Press ALT-U to set unit system)

Date: ********** Time: 11:34 AM

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	100	lb/ft2
Soil Friction Angle	=	29	deg
Soil Unit Weight	=	110.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

****
* RESULTS *
*
*ALLOWABLE BEARING CAPACITY (lb/ft2) *
*

	Terzaghi	Meyerhof	Brinch Hansen
Gross	1851	2426	2145
Net	1823	2399	2118

*
*ALLOWABLE COLUMN LOAD (k) *
*

Terzaghi	Meyerhof	Brinch Hansen
1.8	2.4	2.1

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English
(Press ALT-U to set unit system)

Date: ********** Time: 11:35 AM

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	50	lb/ft2
Soil Friction Angle	=	30	deg
Soil Unit Weight	=	100.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

****
* RESULTS *
*

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	1366	1812	1635
Net	1341	1787	1610

ALLOWABLE COLUMN LOAD (k)

	Terzaghi	Meyerhof	Brinch Hansen
	1.3	1.8	1.6

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:39 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	250	lb/ft2
Soil Friction Angle	=	32	deg
Soil Unit Weight	=	122.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

****
* RESULTS *
*
*ALLOWABLE BEARING CAPACITY (lb/ft2) *

	Terzaghi	Meyerhof	Brinch Hansen
Gross	4790	6615	5297
Net	4759	6584	5266

*ALLOWABLE COLUMN LOAD (k) *

Terzaghi	Meyerhof	Brinch Hansen
4.8	6.6	5.3

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:41 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	250	lb/ft2
Soil Friction Angle	=	27	deg
Soil Unit Weight	=	122.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	3012	3847	3362
Net	2982	3817	3332

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
3.0	3.8	3.3

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:42 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	100	lb/ft2
Soil Friction Angle	=	27	deg
Soil Unit Weight	=	111.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	1530	1950	1778
Net	1502	1922	1750

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
1.5	1.9	1.7

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English
(Press ALT-U to set unit system)

Date: ********** Time: 11:43 AM

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	100	lb/ft2
Soil Friction Angle	=	37	deg
Soil Unit Weight	=	116.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

**********RESULTS**********

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	4628	6912	5219
Net	4599	6883	5190

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
4.6	6.9	5.2

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:44 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	150	lb/ft2
Soil Friction Angle	=	28	deg
Soil Unit Weight	=	110.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	2191	2836	2489
Net	2164	2809	2461

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
2.2	2.8	2.5

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English
(Press ALT-U to set unit system)

Date: ********** Time: 11:44 AM

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	= 1.00	ft	
Footing Depth	= 1.00	ft	
Base Inclination	= 0	deg	
Ground Inclination	= 0	deg	
Soil Cohesion	= 100	lb/ft2	
Soil Friction Angle	= 28	deg	
Soil Unit Weight	= 119.0	lb/ft3	
Depth to Groundwater	= 50.0	ft	
Factor of Safety	= 4.00		

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

****
* RESULTS *
*
ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	1731	2236	2018
Net	1701	2207	1988

ALLOWABLE COLUMN LOAD (k)

	Terzaghi	Meyerhof	Brinch Hansen
	1.7	2.2	2.0

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda Pt. Site 1

Unit System: English Date: ********** Time: 11:46 AM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	150	lb/ft2
Soil Friction Angle	=	29	deg
Soil Unit Weight	=	113.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

****
* RESULTS *
*

*ALLOWABLE BEARING CAPACITY (lb/ft2) *

	Terzaghi	Meyerhof	Brinch Hansen
Gross	2427	3188	2757
Net	2399	3160	2728

*ALLOWABLE COLUMN LOAD (k) *

Terzaghi	Meyerhof	Brinch Hansen
2.4	3.2	2.7

****

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Bearing Capacity Analysis of Spread Footings

Title: Alameda

Unit System: English Date: ********** Time: 02:18 PM
(Press ALT-U to set unit system)

Footing Shape: Square
(Press ALT-S to set footing shape)

Footing Width	=	1.00	ft
Footing Depth	=	1.00	ft
Base Inclination	=	0	deg
Ground Inclination	=	0	deg
Soil Cohesion	=	150	lb/ft2
Soil Friction Angle	=	29	deg
Soil Unit Weight	=	123.0	lb/ft3
Depth to Groundwater	=	50.0	ft
Factor of Safety	=	4.00	

Applied Loads (Needed only if shear>0)
Normal P = XXXXXX k
Shear V = XXXXXX k

RESULTS

ALLOWABLE BEARING CAPACITY (lb/ft2)

	Terzaghi	Meyerhof	Brinch Hansen
Gross	2494	3275	2845
Net	2463	3244	2815

ALLOWABLE COLUMN LOAD (k)

Terzaghi	Meyerhof	Brinch Hansen
2.5	3.2	2.8

FINAL
OPERABLE UNIT 3 REMEDIAL INVESTIGATION ADDENDUM

DATED 27 JANUARY 2001

THIS RECORD CONTAINS MULTIPLE VOLUMES WHICH HAVE BEEN ENTERED SEPARATELY

VOLUME II OF III IS FILED AS ADMINISTRATIVE RECORD NO. **N00236.000304**

VOLUME III OF III WILL BE ISSUED AT A LATER DATE.